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Users Gain Seven Options As Vendors React to 4300

A Monster of a Job

Aided by computer analysis, structural engineers designed the complex Loch Ness Monster roller coaster ride in Williamsburg, Va. — pictured here under construction — with an eye toward maximum safety. Story on Page 10.

NCR Systems Based on Buses

By Howard A. Karten
CW Staff

DAYTON, Ohio — Five bus architecture-based systems designed to compete with the recently announced IBM 4300 systems were introduced here last week by NCR Corp.

Four of the systems — the V-8555M, V-8565M V-8575M and the V-8585M — run in either uniprocessor or multiprocessor configurations. The fifth processor the V-8455 — is an upgrade to the current V-8400 family.

The top two systems in the V-8500M line bracket the performance range of the IBM 4341, while the lower two bracket the 4331 in performance, NCR said.

In addition to the five systems, NCR also announced further operating system unbundling, the establishment of regional service centers for operating systems maintenance and "an advanced I/O method" called Bit Serial Link (BSL), which is reportedly capable of transferring data in a serial bit stream at 10M byte/sec.

With the introduction of the five processors,

(Continued on Page 8)

Burroughs Adds Mid-Scale Systems

By Jay Woodruff
CW Staff

DETROIT — Medium-scale computer users got two more options when Burroughs Corp. recently announced the B2030 and B3950 in apparent reaction to the 4300 series launched by IBM.

Besides introducing the systems, Burroughs announced that it would begin separate charges for its Master Control Program (MCP). Although the company has priced MCP separately on the smaller B80 and B1800 systems, this is the first time a separate pricing policy has been established for this size system, according to a Burroughs spokesman.

Software products required for system operation will now be packaged together and made available for a monthly license fee of $700.

The two latest systems, known as the 900 series, are fully compatible with other Burroughs medium-scale systems. Burroughs users can move up to them or run them in conjunction with installed systems without rewriting or recompiling software programs, the spokesman said.

While Burroughs was unwilling to provide comparison data with the IBM CPUs, it did say the B2930 would be competitive with the 4331 and the B3050 "is aimed at the 4341." The B3050 is said to have five times the throughput of the firm's B2800

The B2030, which the firm called an entry-level system, comes with a minimum of 524K bytes of memory, it can be expanded to a maximum 1M byte in 256K-byte increments. At $3,750 per 256K-byte increment, the Burroughs memory matches IBM's cost of $15,000 per 1M byte.

The basic processor has seven channels, which Burroughs called Data

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It Takes Them Three Years More

Women DPers Cite Promotion Bias

By Ann Dooley
CW Staff

Male DP employees can expect to be promoted to a management position almost three years earlier than women DPers, a recent *Computerworld* survey of women DPers in management found.

The women respondents indicated that men who started in the same position and at the same time worked an average of 5.5 years before becoming managers while the women worked 8.4 years before attaining an administrative position. One woman noted that only men are hired at her company as managers, while another reported that the only man who started with her is now her immediate superior.

The survey, which examined hiring and promotion practices, equality in pay, altitudinal discrimination and career pathing differences between men and women, revealed that most of the women believe sexual discrimination is a problem for women DPers, but only until they reach a management level.

Subjects Hard to Find

However, most respondents agreed, very few women ever reach management level. Their conclusion seemed to be borne out by the difficulty in finding women managers to interview for the survey.

For example, one directory that listed several thousand computer executives contained the names of fewer than 10 women managers.

After searching a variety of sources in an effort to find women administrators, CW interviewed 25. The women hold a variety of management titles ranging from senior project leader to senior vice-president. They work, for the most part, in large companies and represent all sections of the country.

Promotion is one area in which many of the respondents said discrimination exists. Nearly as many respondents — 40% — reported that at some point in their careers they had been passed over for a promotion because of their sex as those who said they had not been overlooked (44%).

Of the remaining respondents, 10% indicated they did not know whether they had been discriminated against

(Continued on Page 4)

Data Base Turns Into Hot Topic At Compcon

By Molly Upton
Special to CW

SAN FRANCISCO — A relational data base management system developed at IBM and Univac's scheme for translating from a relational to network type of data base were two software methods discussed by panelists at the IEEE Computer Society Spring International Conference (Compcon) here last week.

Judging from the number of sessions and the avid attendees at them, the hot conference topic was data base man-

(Continued on Page 6)

In Break With Tradition, IBM to Discount Series/1

By Don Leavitt
CW Staff

ATLANTA — In a sharp break with its traditional pricing policy, IBM last week announced a plan for discounting Series/1 hardware and software, with discounts accelerated as quantities rise — up to a point.

Under the plan, no discount is allowed on orders ranging from one to 49 items in a given category of equipment, but 15% is chopped off the prices on orders involving more than 150 items. Five percent is allowed on orders of 50 to 99 items and 10% is the reduction for orders of 100 to 149 items.

Fifteen percent is the maximum discount no matter how large the order, a spokesman said.

There are several qualifiers in the scheme, which was announced to branch managers early last week. Only items — in hardware or software — for which a one-time payment is already available are eligible for the discount.

Further, only items unique to the Series/1 minicomputer are discountable. Units that can be used on other systems as well as on a Series/1 are not eligible for the price breaks, the

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'Security Still in Witchcraft Stage'

Parker Comes Out for Crime Bill

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Declaring that "computer security is still in the stage of witchcraft," computer crime authority Donn Parker said he is very supportive of the computer crime bill sponsored by Sen. Abraham Ribicoff (D-Conn.).

Parker, senior management consultant at SRI International of Palo Alto, Calif., told a recent gathering of DPers here that he unjustifiably has been identified as a critic of the proposed law. The Federal Computer Systems Protection Act, originally introduced in 1977, was reintroduced in the Senate by Ribicoff last month [CW, Feb. 12].

Although he backs the bill, Parker sees difficulties with its current wording. Discussing the section of the bill that would make all unauthorized use of computers a felony punishable by up to 15 years in prison, he said, "I'm good for at least 40 years in prison under this bill."

Unauthorized work "is done on almost every computer system of which I know," he said, adding that a lot of good has come from unauthorized computer use. But the present draft of the legislation "makes us all unindicted felons," he told a joint meeting of the Washington, D.C., chapters of the Association for Computing Machinery and the Data Processing Management Association.

Definitions Need Work

The problem is the bill was drafted by people who do not know enough about computer crime, Parker stated. Because computer crime is a "very, very difficult subject," Parker said he did not want to criticize those behind the legislation. "It is very difficult to come up with legal definitions of what a computer is."

Nevertheless, he said, the definitions now proposed in the legislation are "technically incomplete, inaccurate and just plain lousy."

The task before Congress is to "free the definitions from changing technology" and "get the jargon out," Parker said. As presently worded, the legislation's definitions of computers "now include 370/168s all the way down to a digital watch.

"We are trying to get parts of [the bill] expanded and parts of it narrowed down," he said. As far as making all unauthorized access of computer systems a crime, he explained that such strictures are probably necessary because of the amount of sensitive, valuable information now being stored in computers.

"We are all going to have to change the way we do things," Parker reasoned. "Management is going to have to spell out to its employees what is authorized and what is not authorized. I think it will be beneficial" to know what is accepted and what is not, he said. "I don't see any alternative."

Data Encryption Inadequate

Regarding computer security, Parker said data encryption, currently a topic of considerable interest in the DP community, is not a good deterrent to computer crime. "No one would be dumb enough to tap a data communications line," he stated.

For far less money and bother, a criminal could bribe a bank employee to give him all the necessary codes and information to directly access the bank's computer system, Parker said. "The [commuoications] line is not the weakest link today," he remarked, although he conceded it could be in the future.

"So why all this interest in encryption today?" he asked. It is intellectually attractive to computer scientists — a "fun thing," he said.

It is, however, "a good example of how we are anticipating future problems." Encryption soon will be so widespread that there probably never will be serious danger of criminals tapping data communications lines, he added.

Encryption of stored data is a possibly effective method of protecting information, Parker continued. But presently it is too expensive to be practical and conceivably could lead to crimes of extortion.

Background Checks

Discussing preemployment background checks as a deterrent to hiring potential computer criminals, Parker said he is not aware of any study that ever proved the value of such investigations. Of the dozens of computer criminals he has interviewed, he said background evaluations would not have turned up anything of value.

But, he noted, it is an accepted canon of industrial security that background investigation will probably become as common in computer environments as in the defense environments today.

SRI International is doing research to develop pilot systems that will demonstrate ways to build secure DP systems, Parker said, but the project is far from complete. It will be eight to 10 years before "safe" systems are commercially available, he predicted.

Ironically, as the problem of data security grows with the proliferation of DP systems, the solution to computer crime lies in that proliferation, he said. "The more automatically we can serve people through computer technology, the more secure the transactions will be," he believes.

Correction

In "Center Provides Backup If Disaster Hits System [CW, Feb. 19], *Computerworld* unintentionally scrambled the biology of the interviewee and referred to Campbell Soup Co.'s Lynn McCabe as a woman. McCabe is a man.

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FORTUNATE

34 of the 50 largest firms now sort with SyncSort, right?

(Wrong! 39 do.)

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It happened recently at one of those roundtable management meetings for which Whitlow is so justly famous.

"How many of the top 50 companies on the Fortune 500 list use SyncSort?" someone asked.

"Thirty-four," somebody replied. "At least that's what we said last summer."

"Let's see what it is now," said our president — a man not overly fond of approximations.

In came the print-out sheets showing SyncSort's more than 2,000 OS and OS/VS users. Out came the pencils. Down went the check marks.

When we'd finished, we discovered that 39 of the 50 giants shown below now sort with SyncSort. Up five from our last report:

RANK	COMPANY
1	General Motors
2	Exxon
3	Ford Motor
4	Mobil
5	Texaco
6	Standard Oil of California
7	International Business Machines
8	Gulf Oil
9	General Electric
10	Chrysler
11	International Tel. & Tel.
12	Standard Oil (Ind.)
13	Atlantic Richfield
14	Shell Oil
15	U.S. Steel
16	E. I. du Pont de Nemours
17	Continental Oil
18	Western Electric
19	Tenneco
20	Procter & Gamble
21	Union Carbide
22	Goodyear Tire & Rubber
23	Sun
24	Phillips Petroleum
25	Dow Chemical
26	Westinghouse Electric
27	Occidental Petroleum
28	International Harvester
29	Eastman Kodak
30	RCA
31	Rockwell International
32	Caterpillar Tractor
33	Union Oil of California
34	United Technologies
35	Bethlehem Steel
36	Beatrice Foods
37	Esmark
38	Kraft
39	Xerox
40	General Foods
41	R. J. Reynolds Industries
42	Ashland Oil
43	LTV
44	Monsanto
45	Amerada Hess
46	Firestone Tire & Rubber
47	Cities Service
48	Marathon Oil
49	Boeing
50	Minnesota Mining & Manufacturing

Sorry, we can't tell you the names of the five newcomers or the 34 old timers. But we will reveal — fearlessly — that No. 7, above, is not to be found in either category.

After all, IBM makes sorts, too. (But if things go on this way, they may be the only member of the top 50 that still uses IBM sorts!)

We agreed that SyncSort's popularity with IBM's peer group — and the rest of the 500 list — is a matter of performance, not name. Leading data processors tend to buy software the right way — by competitive benchmark.

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Profile of a Woman DPer in Management

By Ann Dooley
CW Staff

She is college-educated, has spent most of her working career in DP, has changed jobs several times but has spent the last number of years working her way up through the ranks at her current company to reach a management position."

That is the profile of a woman DPer in management drawn from a recent *Computerworld* survey. The survey also found the typical woman DP administrator likely to be divorced or never married; in her 30s and earning $30,000 to $40,000 a year.

Most of the women surveyed (40%) began their careers in a trainee capacity — usually programming; 28% started as full-fledged programmers. There was no link between the amount or kind of education and the women's starting positions, however.

The remaining respondents' first jobs were as systems analyst trainees, keypunchers and an assortment of other jobs.

The women surveyed have been working in DP five to 30 years, with the average 14.9 years. Forty percent have been in DP 10 to 15 years, 28% for 15 to 20 years, 20% for five to 10 years and 12% for 25 to 30 years.

The women have held DP-related jobs ranging in number from two to 10, 4.7 jobs the average.

Years Before Promotion

The average number of years worked by the women before being promoted into management totaled 8.4. The respondents have generally worked for their current employer longer than for any other, an average of 10.5 years.

Seventy-six percent said they had worked their way up within the company to their present position, while 24% said they were recruited to their present position in management.

Almost all of the women interviewed believe they wield clout within their department, although not necessarily within their company. The women supervise 53.3 employees on the average.

In their present positions as managers, they believe they encounter significantly less discrimination than they did in nonmanagerial capacities.

More than half of the women managers earn salaries of between $30,000 and $40,000 a year; 20% earn $20,000 to $30,000; and 12% earn $15,000 to $20,000. Twelve percent earn more than $40,000 and 4% less than $15,000.

More than half the women surveyed are between the ages of 30 and 40 with 36% between 40 and 50 and 12% between 50 and 60.

Forty percent are married, 24% are divorced, 24% are single, 8% are widowed and 4% are separated.

Most of the women had obtained some kind of advanced degree: 68% had attended college (with several holding a master's degree), 8% had attended a vocational/technical school and 4% had attended both.

Only 20% had not completed an advanced degree of some kind, although some have taken courses toward one.

Opportunities Opening Up

By CW Staff Writers

Expanded opportunities for women DPers in every job category but management is the single largest improvement in the DP industry, according to a *Computerworld* survey of women managers.

Job opportunities for women seem to have opened up almost across the board, according to the respondents. They reported noticing more women not just in programming and systems analysis, but also in such areas as sales and computer operations — areas formerly considered somewhat closed to women.

But the majority of respondents stressed that more women are needed at the management level. These managers should become more visible inside as well as outside a company in order to provide an example to managers in other companies as well as to other women who are looking for role models, the survey subjects said.

One woman who believes there is no discrimination in DP said that with all the opportunities for women, "the fellows are beginning to feel they're getting the 'short shift."

The woman, a senior vice-president, expressed surprise at CW's difficulty in finding women DP managers to interview for the survey. She said the difficulty probably stemmed from DP's starting in male-dominated business offices and therefore beginning primarily as a man's profession.

Women Report Promotion Discrimination

(Continued from Page 1)

since it would have been difficult for them to detect.

A majority of the women feel that different criteria are used in hiring a woman than hiring a man. Sixty-four percent said women are judged differently, 20% reported no difference, 4% said there is no conscious discrimination and 12% were unsure.

A number of the respondents reported that female employees have to be better qualified than a male in order to be hired, have to overcome stereotypes of female emotionalism, must compensate for "being a woman" or have to fit in with the male executives.

One woman reported that a company which was considering hiring her brought in a woman administrator from another company to see if she was "female management material."

As many as 28% of the respondents reported they had left a job because of discriminatory practices. One said she had stayed with her job because "it wasn't any better anywhere else."

Although all but one of the women managers reported one or more areas of discrimination within the industry, 76% rated the computer industry better than other fields in opportunities for women. Several qualified their answers by saying the opportunities only go up to the management level and stop; others indicated that because of the great demand for programmers and systems analysts, women are given more of an opportunity — something that might not happen if the need were not so great.

The CW survey of women DPers in management was conducted by staff writers Ann Dooley and Tim Scannell.

Eight percent said DP is no better than other fields, while 16% indicated either that it is in the mid-range or that opportunities depend on the specific organization and people or said they were unsure whether DP is better than other professions.

Many of the women acknowledged they had to fight discrimination even before entering the industry. Thirty-six percent remembered being discouraged from pursuing a science or math curriculum while in school and 8% said they were discouraged but thought it did not occur anymore; 24% said they had been encouraged to pursue a science or math degree.

Equal Pay

On the brighter side, most of the women administrators believe male and female employees are paid on an equal basis. Nearly two-thirds reported that their pay is equal to that received by men, although 25% of that number reported that salaries had equalized only within the last few years.

More than one-third of the respondents said women are still not paid as much for the same job as men.

In their role as women managers, 36% reported they had work-related problems with men or women under their supervision because of their sex. Several reported their women employees found it more difficult to work for a female supervisor than the stereotypical male supervisor.

Nearly half of the respondents said their companies make no conscious effort to recruit women for management and executive positions, while another 12% indicated that hiring and promotion is based completely on qualifications.

The remaining respondents reported their companies do make an effort, but 20% qualified their answers by reporting that recruitment is done only when required by law, is not extended to top management or is limited by a "fear of having too many women managers.".

Sixteen of the 25 women interviewed said that at their companies male managers significantly outnumber female managers. These women indicated that 5.2 males are employed at a management level while only 1.7 women are in management. Of the 16 women, 62% said they are the only females at management level in their department.

But the respondents could mention few, if any, job categories in which women are not represented. When women were absent, their absence seemed to stem from circumstance rather than overt discrimination.

Almost all of the women indicated they command authority in their jobs. Only 12% do not have the authority to hire their own staff and make their own budgets; 68% reported they exercise complete authority over those duties; and 20% said they are responsible for hiring and budget making, but with certain qualifications such as advice from the personnel office or budget consultation with a superior.

Seventy percent of the women surveyed have their own offices and secretaries while 8% have neither.

All of the women strongly believe they exercise clout within their departments, with some of the newer administrators indicating they are in the process of building that clout.

Respondents said more men were promoted in all categories in their departments last year than women, but not by a particularly wide margin. On the average, 4.7 men were promoted while 3.7 women advanced in rank.

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NCC Slates '80 Conference on Office Systems

ATLANTA — The National Computer Conference will sponsor a three-day meeting on office automation here next year on March 3-5 that will be based upon the same format of sessions, workshops, panel discussions and product exhibits as the yearly NCC.

The 1980 Office Automation Conference (OAC) will be directed toward the general business community and tackle state-of-the-art developments in automated office functions and industry developments, a spokesman stated.

Speakers and exhibits will attempt to introduce the user or potential user to what is available in the field, as well as explain the various systems and outline ways to assess the different costs of automated office facilities.

Evolution of Idea

The idea for the conference evolved from a series of studies conducted by the NCC committee and from more than two years of research and recommendations by the NCC staff, the spokesman explained.

Although registration fees are not available yet, information on participating in the conference program or exhibiting at the NCC OAC can be obtained from Jerry Cluttriller, 210 Summit Ave., Montvale, N.J. 07645.

Gunmen Seize IBM Office In Tehran

TEHRAN, Iran — A group of gunmen reportedly sent by Ayatollah Khomeini's revolutionary committee recently took over IBM's headquarters here, temporarily detaining the firm's 330 Iranian employees.

The gunmen wanted to question the IBM workers to determine if any had connections with the U.S. Central Intelligence Agency, with Savak — the shah's secret police — or with Israel, but left after a brief discussion with local IBM management, according to a spokeswomen. Although the group carried weapons, no shots were fired and no one was arrested.

No Americans were involved in the affair since all foreign nationals working for IBM had left the country, the spokeswoman added.

Although the street fighting and rioting in Iran has made servicing the firm's computer equipment difficult, IBM's Iranian employees — responsible for maintaining the machines — are "continuing to serve the customers as well as conditions will allow," she said.

Data Flow Meet Set This Week

NEW YORK — The existing and potential impacts of data flow regulations on international corporate communications will be the topic of a series of one-day seminars that will be held in four different cities beginning today.

Entitled "Strategic Responses to Transnational Data Flow Regulations" and sponsored by Link — an advisory service firm — and Transnational Data Reporting Service, Inc., the meeting will be held today in Washington, D.C., on March 6 in New York, Chicago on March 8 and San Francisco on March 9.

Companies Addressed

The seminars are addressed primarily to companies whose markets and internal information requirements may be affected by transnational data flow regulations and to governmental organizations responsible for information, data processing and telecommunications, a spokesman said.

Sessions will focus on the background of data flow issues, the current regulatory situation, international data traffic and national information policy developments, as well as case studies of data flow practices and problems confronting major organizations.

The registration fee for the single-day event is $45. Additional information is available from Link, 215 Park Ave. South, New York, N.Y. 10003.

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Denser Disks Seen Future Way to Manage Data

By Molly Upton
Special to CW

SAN FRANCISCO — Mass storage devices and a disk controller with an extra dose of logic are hardware-oriented approaches to data management, according to one set of panelists at the IEEE Computer Society's Spring International Conference (Compcon).

Amidst an undercurrent of jesting between semiconductor and magnetic-recording advocates, representatives from IBM and Univac agreed at a session on "Architecture and Technology for Data Management" that denser disks can be expected.

George Champine, director of advanced systems at Univac, said the capacity per spindle has been doubling every 30 months for the past 10 years. He envisions 1G byte/spindle within the next 18 to 24 months.

Al Hoagland, manager of recording media at IBM's San Jose operation, said the 1980s will bring several thousand megabytes per spindle with areal density approaching 100 million bit/sq. in. (or 10⁸).

Hoagland termed magnetic recording the "most enduring, but also the most pervasive of digital storage technologies." Moreover, "continuing obsolescence of magnetic recording products has arisen not from alternatives, but from advances in the technology itself."

He defined mass storage as that which has a "capacity larger than will ever be economic with solid-state technology." The market for storage is so elastic that some installations buy twice as many drives every time IBM doubles the capacity of the drive, he said.

CW At Compcon

But main storage is also making rapid progress, Champine pointed out. Larger and cheaper than mass storage was 10 years ago, main storage is assuming a more important role, he said. Every three years the number of bit/chip quadruples, while the cost/bit decreases by a factor of 2.

A hardware approach to handling data bases was presented by Vic Maller, senior research consultant at International Computers Ltd.'s (ICL) Research and Development Center.

By equipping the disk controller with one and a half to two times as much logic as normal, ICL developed a Content Addressable File Store (Cafs), which Maller described as a "skateboard under the software." The unit operates by concurrently conducting many searches on one stream of data consisting of five basic units.

These include a direct access unit for conventional disk operation, a microprogrammable selection unit for identifying hit records, a retrieval unit for returning hits, a file correlation unit and a miniprocessor for resource management and scheduling.

Performance gains of Cafs over standard techniques in representative batch tasks, such as report generation, can be as much as 50 times, Maller said. In telephone directory assistance, the Cafs can handle 35 search/sec and reduce other jobs, such as people matching, from 245 to 98 hours, he noted.

However, in applications such as credit/debit, it probably isn't any better than a conventional system, Maller noted. The unit is experimental, but ICL has shipped one.

Upton is managing editor of EDP Industry Report, *an International Data Corp. publication.*

Data Base Turns Out to Be Hot Topic

(Continued from Page 1)

agement, with an emphasis on ease of use, ways to get one type of data base to communicate with another and methods of organizing distributed data bases.

At a session on "Architecture and Technology for Data Management," George Champine, director of advanced systems at Univac, briefly described a common data model that allows the translation of schemata between network and relational systems. There is a mechanized translator that works well at this task, he said.

At the logical level, an almost one-to-one mapping exists between features in the two types of systems, he said. The translation of algorithms occurs at the data definition and data manipulation levels, the translating mechanism maps off the storage or superimposes constructs from one model on constructs of the other.

Relational Approach

Jim Gray from IBM's San Jose research laboratory represented at Compcon a substantial number of IBMers who have developed a relational data base management system known as System R. The system is experimental and not a product, Gray stressed.

The design goal was ease of use. The group used a nonprocedural language called Sequel (SQL), a unified data descriptor and data manipulation language.

The group decided the description of data was in itself a data base, and the system therefore embodies an integrated data dictionary. All data in System R is organized into tables.

To promote ease of use, the system has a query capability that can handle ad hoc requests. This is made possible through a host language interface called the User-Friendly Interface (UFI), which is basically an interpreter.

Constraints Overcome

System R overcomes some of the constraints of nonprocedural language by extending Cobol and PL/I to permit SQL statements to be embedded in the application program, Gray said.

To further enhance performance, the system has a compile feature. Gray said that if one uses System R as he does IMS, he should get performance comparable to IMS; if he simply uses SQL statements, however, "then "all bets are off."

System R permits different groups of users to have their own data base administrators, all of whom can initiate changes without shutting down the system, he claimed.

Users can acclimate to the system after about two hours of lecture and start by playing with a toy data base and UFI. They would then define their own data base and write their own programs, he said.

Upton is managing editor of EDP Industry Report, *an International Data Corp. publication.*

IBM to Discount Series/1

(Continued from Page 1)

spokesman emphasized.

Finally, the announcement said that to be subject to discounting, the items have to be installed within 18 months of the order date. The spokesman said it seemed reasonable to assume that would cover equipment which is merely delivered to the purchaser, even if it is stored until the purchaser is ready to use it.

The break with tradition was so clear it took some observers by surprise, even though there had been rumors that IBM's General Systems Division was planning some move to encourage sales of the Series/1. "They must have had to twist some arms to get them to agree to that plan," one former OEM said.

Until now, IBM has put fixed prices on all of its hardware and software, with the 150th unit, for example, costing exactly the same as the first delivered to a user.

Discount by Category

It is important for potential purchasers to understand that the discount plan applies by category of item ordered, the IBM spokesman noted. These categories are fairly broad — CPUs, printers, terminals or software, for instance — but they are firm.

As an example, the company said that if a user ordered 60 CPUs, even of mixed types, and 180 terminals, the portion of the order dealing with the CPUs would be discounted 5%, while the terminals cost would be reduced 15%.

Although most IBM software has been provided under license and subject to monthly fees, operating systems and similar programming necessary to the operation of the equipment has generally been free.

With the Series/1, however, IBM has charged for such support facilities as the Real-Time Programming System (RPS) and the Event-Driven Executive. Orders for that separately priced, single-payment software will be eligible for the discounts, IBM said.

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Expects to Save $10 Million

N.Y. Matches Files, Finds 7,000 Welfare Cheats

By Ann Dooley
CW Staff

ALBANY, N.Y. – In a legislative effort to trim its welfare rolls, New York State has implemented a computer cross-check system that matches welfare recipients with all wage earners – and initial findings have shown 70,655 persons on both rolls.

Some 7,000 of those are believed to be receiving funds fraudulently.

The first quarterly match-up also resulted in 15,356 "hits" on individuals who were earning wages while collecting unemployment insurance.

Cross-checks were initiated after a law passed by the Legislature last July at the request of Gov. Hugh Carey mandated the state departments of Social Services, Labor and Taxation and Finance to coordinate their efforts to find duplications and errors in the welfare and unemployment insurance systems.

The majority of persons identified by the computer match could have valid reasons for appearing on duplicate lists, officials pointed out. Many may be earning minimal wages, thereby still qualifying for state aid; others could be persons who hop from employment to public assistance and back again.

The names of people found on two lists will be forwarded to the appropriate counties, which are required by the new law to follow up on the reports and report back to the Department of Taxation and Finance within 60 days. Those who are found to be receiving state aid to which they are not entitled will have their grants reduced or eliminated.

Fraud Figures Not Unexpected

The data for first cross-check came from statistics on all employees in the state and all those on welfare or unemployment insurance as of last September. Once the program is fully operational, the matches will be performed quarterly, with the information being processed on a weekly basis, according to Herbert Klein, DP director for the state Department of Taxation and Finance.

This is the first time New York State has conducted soch an extensive match using data from all social service recipients and all of the state's six million employees. Previously, only public employees or certain types of recipients had been matched in more limited programs.

The figures on welfare fraud uncovered by the computer matching were similar to those predicted by the Department of Social Services last year, according to Barbara Blom, state commissioner of social services. The resulting dollar savings from the discovered fraud attempts will amount to nearly $10 million, she added.

Of the more than 950,000 welfare recipients who were checked against the list of wage earners, 70,655 were foond on both lists; of the 209,524 individuals collecting unemployment, 15,356 were found to be earning wages as well. Carey indicated he was pleased with the preliminary findings and said, "It seems it was a worthwhile effort."

Privacy Guarded

Although three departments are participating in the match, the state required that only the Department of Taxation and Finance compile the statistics since confidentiality is an important aspect of the project. The tax department was chosen because employers were hesitant to comply with the law, but agreed to do so if the Department of Taxation processed the data. The business commonity reportedly has confidence in the agency's handling of personal information.

The cross-check system is coordinated so that the other two agencies compile their routine information and then transfer the required data onto magnetic tapes which are sent to the tax department. The tax department then runs the tapes against the wage earning reports it has obtained from employers across the state.

The data from the Social Service Department encompasses all welfare recipients, welfare applicants and missing parents. The new system also allows agencies to track down a missing parent through his employer.

Fail-Safe Security

The system is programmed with a fail-safe security device, according to Klein. The first run of the wage earning reports and unemployment insurance or welfare rolls compares Social Security numbers. If any numbers from the two rolls match, the names are run against each other to see if they also correspond.

If they do, only then will the wage information be given out to the appropriate department, Klein said. It is critical to the program to ensure that the right agency is getting the right data and at the right time, he said.

"Confidentiality is oor main goal," he added.

The computer which the tax agency uses to match the data is a three-processor Univac 1100/43 system with two I/O processors. The system has 17G bytes of disk storage and nearly 200 terminals operational for the match program. The real-time system runs under Univac's Exec 8; the 80 programs are written in Cobol.

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NCR Processors Based on Bus Architecture

(Continued from Page 1)

NCR halted production of earlier V-8500 systems and reduced memory prices on the older systems as well as the latest units. The five systems feature 370 nsec read and 440 nsec write memory cycle times and machine cycle times up to 56 nsec, the firm said.

Any 8500 can be intermixed with up to four processors in a tightly coupled multiprocessor configuration, according to NCR. The vendor claimed this is the first time processors of differing powers can be intermixed in a multiprocessor configuration.

Sizes and Prices

The largest system, the V-8585M, which has a cycle time of 56 nsec, offers a minimum of 2M bytes and a maximum of 6M bytes of memory. It provides approximately 65% more processing power than NCR's current V-8580 for a cost of 20% less, according to a spokesman.

The multiprocessing version, designated the V-8585MP, is said to offer approximately 1.7 times the throughput of the single-system version.

Just under that system in performance is the V-8575M, with a 56 nsec cycle time and throughput said to be 24% greater than the V-8570. At a cost uf $225,300 for a 2M-byte system, this processor offers users a savings of approximately 37% over the V-8570, the spokesman said.

Users can attach up to 4M bytes of memory to the processor, he added.

The next largest system, the V-8565M, provides a 45% increase in throughput over the V-8560, again at a savings of 37% over that system. Memory on the system ranges from 1M to 3M bytes and the basic cycle time is 84 nsec.

The smallest system of the V-8500M family, the V-8555M, has a 112 nsec cycle time and can accommodate a minimum of 512K bytes and a maximum of 2M bytes. Performance is said to be 30% above the V-8550 at a price 36% below that processor.

The V-8555M offers approximately 47% more processing power than the IBM 4331 at a 28% increase in price, NCR claimed.

The V-8535M carries a price tag of $88,035 for a 512K-byte system. Additional memory for this system is priced at $10,000 for each 512K-byte increment.

Additional memory for the larger three systems is priced at $20,000 per 1M byte, $5,000 more than IBM is charging for the same amount of 4300 memory.

The smallest system announced by the firm — the V-8455 — includes 512K bytes to 1M byte of main memory. It costs $50,180.

The V-8455 offers 90% of the processing power of the IBM 4331 at 73% of the cost, NCR said.

On three-year agreements, monthly rental prices on the systems are as follows: a 2M-byte V-8585M, $9,792; a 2M-byte V-8575M, $5,884; a V-8555M with 512K bytes, $2,363; and the V-8455 with 512K bytes of memury, $1,330.

All of the units will be available in the second quarter except for the V-8585M, which will be shipped in the third quarter. Multiprocessor configurations will be available in the first quarter of 1980.

Firmware Required

The five systems use NCR's Virtual Resource Executive (VRX) operating systems. The V-8500M processors accommodate VRX-MP for multiprocessing capability, NCR said.

However, users must install firmware to run the operating systems, the spokesman said, noting the firmware is available on a monthly license fee only. The fee for the V-8555M is $345/mo; for the V-856M, $470/mo; for the 8575M, $610/mo; and for the V-8585M, $940/mo.

Furthermore, users with multiprocessing configurations will need additional firmware at a monthly cost ranging from $585 to $1,600, depending on the configuration chosen.

Under a release of VRX expected in the first quarter of 1980, users will not only be able to run multiple jobs, but will also be able to run multitasking within a job, NCR said. The use of these parallel multitasking techniques will provide more parallel operation of "critical" software segments, the spokesman explained, adding this should improve transaction processing operations and system reliability.

Peripherals available with the new systems use the ESL protocol and include disk storage units, magnetic tape units, printers and card readers.

The disk storage subsystems include the NCR 6530 with 81M bytes of fixed and removable disk, the 6540 with a 540M-byte capacity and the 1G-byte 6550 disk subsystem. The transfer rate for the three subsystems is 1.2M bytes/sec.

The BSL method uses coaxial cable, which reduces cost and site preparation requirements, NCR said.

As part uf its customer software support programs, the company said that beginning in the first quarter of 1980 it would make available on a fee basis its on-line software service data base. This data base is currently accessible by NCR systems engineers for customer software support.

The on-line software support data base is supplemented by regional centers staffed by experts who provide telephone support for medium- to large-scale systems using the VRX operating system and other advanced software. Local system engineering support is also available to service the five latest systems, the firm said.

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NCR Adds Mid-Scale Units

(Continued from Page 1)

Link Processors. Each channel has an independent microprocessor programmed to service a particular type of peripheral. An eighth channel is optional.

The B3950 comes with 2M to 5M bytes of memory — 1M byte more memory than the IBM 4341 can support. It can be expanded from a minimum of seven Data Link Processors to 32, the spokesman said.

Software Debuts

Two software products were introduced with the systems — a Workflow Management System and a Data Management Inquiry System. The first provides control capabilities that allow the user to override the MCP's automatic work schedule and customize the machine's operation for a particular group of jobs, while the second facilitates information access to the CPU's data base by authorized persons and programs, Burroughs said.

The 900 series' microcircuit logic technology features chips that reportedly contain as many as 800 gates each. High-speed storage devices make instruction codes available to the processor in 45 nsec, according to Burroughs.

16K-Bit Chips

Memory in both systems is made up uf high-speed 16K-bit chips. Their high density contributes to the smaller size of the 900 series compared with the previous 800 series.

The B2930 uses half the power and takes up half the space of its 2800 counterpart, the spokesman said, adding that the B2930 and B3950 have two to five times the throughput of the older system.

The systems include a separate data communications processor, a microprocessor-based disk controller, an operator console, operator display and a 243K-byte floppy disk drive for use in system maintenance. A second built-in floppy drive for data loading programs is optional.

'Modular' Architecture

"Micro-modular, concurrent" architecture is featured in the 900 series. "Modular" means a central system made up of independent processing elements, or modules, each of which is dedicated to specified steps in the overall tasks, Burroughs said.

Each module's functions are stored in programmed micrologic circuits. Each can run at full speed, concurrently with the others, maintaining top efficiency and a consistently high throughput, the firm added.

The B2900 and B3900 central processors include:

- Program module. This prefetches program instructions, analyzes operations, calculates data addresses and passes the translated instruction information to the address buffer. Until the control module accepts them, the buffer acts as a holding station for the translated instruction.
- Control modules. This module processes the translated information and passes the addresses, size and formats of the operation to the memory access module.
- Memory access module. This unit performs all data ur memory accesses required by the execution mudule, and stures or retrieves the data in the data buffer.
- Execution module. Here the specified arithmetic, logical and special operations are performed.
- Data buffer. This temporary store and work area is for data that has been or will be processed by the execution unit.
- Memory control module. This unit requests from the memory access module and the I/O processor.

The 900 series will provide additional reliability over previous models with on-line diagnostic routines that allow the testing of system operation while the system processes its regular work, Burroughs said. In addition, an internal environmental monitoring feature warns against excessive heat or power fluctuations.

Software Required

Software packages required for the 900 series — and available for the $700/mo fee — include MCP VI; an enhanced version of Burroughs Network Definition Language (NDL); the Generalized Message Control System (Gemcos) for such data communications functions as transaction routing, audit and recovery, concentration and network statistics; and language translators.

One-year lease prices on the B2930 are $4,250/mo for a 524K-byte, 7-channel system and $4,635/mo for a 1M-byte, 8-channel system. The B2930 costs $140,000 to purchase.

A one-year lease for a 2M-byte B3950 with seven channels is $7,200, rising to $13,145/mo for a fully configured system. Purchase prices range from $230,000 to $399,640.

The units will be available in the last quarter of 1979, Burroughs said.

Data Base Tracks Boats

DP Helping Stanch Drug Flow to New England

By Tim Scannell
CW Staff

BOSTON — Flecked by hundreds of hidden inlets and quiet harbors, New England's coastline has attracted a lucrative business that has been the target of government law enforcement agencies and at least one computerized watchdog.

For the past few years, the multibillion dollar marijuana smuggling industry has used the Northeast's harsh and sprawling shoreline to evade police and filter drug shipments from Colombia into such major markets as Boston, New York and Washington, D.C. Piloting fishing boats, private yachts and virtually anything else that will float, smugglers have risked capture and imprisonment to peddle the leafy product, which currently retails for about $400 to $600 a pound in the U.S., according to Edward Cass, chief of the federal Drug Enforcement Administration's (DEA) Boston office.

New England's increasing drug traffic and smuggling activities is a result, in part, to a crackdown on the flow of marijuana by the southeastern states. Although Florida is still the No.1 entry point for marijuana smugglers, "more effective enforcement methods there gradually forced the violators to come further up the coastline," Cass said. "They reached us about two years ago."

Operation Atlantis

To stem the flow of marijuana through New England's ports, Cass set up a multiagency task force — code-named Operation Atlantis — involving the DEA, the U.S. Coast Guard, Internal Revenue Service intelligence, U.S. Customs and scores of local police departments. In effect for a little more than a year, the cooperative operation has already resulted in the seizure of approximately $89 million of Colombian marijuana from suspected smugglers, Cass stated.

"The first three months of the operation we did nothing but cross-train each other," the DEA head recalled. But "now we have the expertise at DEA that . . . I didn't realize even existed."

Coast Guard intelligence, for example, doesn't merely look at a suspected drug-laden boat, it also measures the fuel left in its tanks, notes the configuration of the hull at the water-line and checks engine fuel consumption. This may all add up to information on where and when a boat is likely to dock for fuel or drop off an illegal marijuana shipment, Cass explained.

Central File

Besides monitoring coastal waterways and keeping watch for suspicious activities, Atlantis members also have access to a computerized data base that lists the exact whereabouts of specific vessels thought to be transporting illegal drugs into the country. The Texas-based El Paso Information Center (Epic) can not only keep tabs on possibly marijuana-filled boats and ships approaching U.S. shores, but can also put the appropriate law enforcement agencies in touch with one another.

Epic "gives us a central file that can be easily checked," Cass noted. "You can sit in the 24-hour communications center in El Paso and talk with a Coast Guard cutter 200 miles off the coast of Cape Cod about a suspected vessel."

The computer also keeps track of unusual boat sales, equipment purchases and minute scraps of shipping and nautical information that might later be pieced together to reveal a future drug delivery. For example, people who use large amounts of cash to buy boats or discreetly acquire extensive conveyor systems used by shippers to move heavy cargoes could be pointed out by the federally run computer.

Coast Guard ships at sea, as well as local police departments and agencies, access the Epic system via a teletypewriter located in the Boston DEA office. Data within the system is updated constantly and usually maintained for 30 to 90 days. This is more than enough time for the police to find out if a bit of information is worthwhile or useless, Cass said.

"An awful lot of intelligence is good, but if you don't act on it within a couple of weeks, it really will never be of value," he pointed out.

Privacy Rule Skirted

Aside from the obvious advantage of bringing the various law enforcement agencies together to fight a common foe, Operation Atlantis also skirts a burdensome privacy rule which prohibits divulging specific information to other agencies under penalty of a $5,000 personal fine, Cass stated. A clause in the rule reportedly exempts task forces from complying with the privacy guidelines.

Although smugglers have a constantly changing image, the DEA and intelligence analysts have developed a profile of the typical marijuana importer. According to Cass, he is usually a person who purchases items with cash on a no-questions-asked basis and shows more concern for how deep the water is at low tide on a certain beach rather than how attractive the area is

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1. The educational approach used in this book has been taken from a book called *Standard COBOL* by Mike Murach. This book has been used in more than 200 colleges and universities for classroom instruction, by dozens of businesses for inhouse training, and by thousands of professionals for self-instruction. As a result, the method of instruction has been proven many times over.

2. This book was written under the technical supervision of Paul Noll. Paul has been a software specialist and training manager for Pacific Telephone; he now consults in businesses throughout the nation, and he is manager of the COBOL group in GUIDE, an association of large IBM users. Paul has taken pains to see that the COBOL in this book is not only accurate, but that it also represents the practices that are currently in use in the best COBOL shops in America.

3. Because we feel it's impossible to teach a student how to code structured programs without also teaching him how to design structured programs, this book gives extensive coverage to modern design techniques. In my opinion, this material is essential to learning structured COBOL, even though you won't find it in most competing books and courses.

What this book does

In brief, a student who completes this book will have the skills of an entry-level programmer in industry. In terms of COBOL, the book teaches a professional subset that includes JCL and COBOL for sequential files on tape or disk.

Because two sets of COBOL standards are currently in use (1968 and 1974), this book teaches a subset of the two that will run on either a 1968 or 1974 compiler. By using this subset, you won't have to modify the programs you write in 1968 COBOL when your shop converts to 1974 COBOL. If you are already using 1974 COBOL, this book prepares you for maintaining 1968 programs, converting 1968 programs to 1974 COBOL, and developing new programs in 1974 COBOL.

Since the emphasis of this book is on standard COBOL, you will find it useful no matter what system you're using. However, this book is specifically designed for users of DOS or OS on the System/360-370. In particular, it presents a programmer's subset of DOS and OS JCL along with the important IBM extensions to standard COBOL.

Related products for the experienced programmer

This book is part 1 of a two part course in structured COBOL. Part 2, which is designed to teach advanced COBOL features, will be available in July, 1979. These books, however, fulfill only one of the training requirements for COBOL programmers.

The other requirement is to teach experienced COBOL programmers to use the new productivity techniques. For this purpose, Paul Noll developed a book called *Structured Programming for the COBOL Programmer*. This book is currently used by hundreds of companies for programmer training. And it can increase morale at the same time that it increases productivity.

As a reference manual for the development of new programs, Paul developed *The Structured Programming Cookbook*. It presents standards and guidelines for a structured COBOL shop that have been adopted by hundreds of companies throughout the country. And it presents complete solutions for four business programs. By using these model solutions as guides for new program development, a programmer doesn't have to start each program from scratch. In this way, the Cookbook can have a major effect on programmer productivity.

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With Stress, Force Analyses

Graphics Takes Kinks From Roller Coasters

By Marguerite Zientara
CW Staff

SAN JOSE, Calif. — Millions of people are thrilled every year by computer analysis without ever knowing the part it plays in designing the ever-wilder and more scintillating roller coaster rides throughout the world.

Ruth & Going, Inc., however, an architectural/engineering firm here, is well aware of the role of computer analysis in the design of such rides as the Loch Ness Monster, Turn of the Century and Pontchartrain.

After many hours of testing and building actual scale models of a particular thrill ride, Arrow Development Co., an amusement ride manufacturer in Mountain View, Calif. contracts with Ruth & Going to do the studies necessary to ensure the safety and soundness of the ride.

Modeling for Safety

"Our job is to model the whole ride for structural safety, to see that the stresses are low and that the members aren't going to deflect, bend or break," according to Dennes Furia, structural designer.

To do that job, Ruth & Going uses McDonnell Douglas Automation Co.'s (McAuto) interactive graphics display system, Fastdraw, and its structural design and analysis system, Strudl.

"Fastdraw allows us to create an actual model of the ride and turn it three-dimensionally to view it from various angles in preparation for the computerized structural analysis," Furia explained. The Strudl program allows the structural designers to analyze such things as wind loads, earthquake loads and the load of a vehicle as it travels through the ride.

"With these rides you are working with a geometry vastly different from that of a rectangular building," Furia pointed out. "You have compound curves and other twisting, looping, spiraling elements to consider.

"And today there are new concepts in rides, such as high, upside-down loops and tight corkscrew spirals," he added. "Without Fastdraw, it would be difficult to know you had made a proper model of such a structure before doing a complex computer analysis, but with it the model can be corrected or altered from the terminal before starting the analysis."

Acceleration Forces Analyzed

Acceleration forces used in the computer analysis of a new roller coaster are taken from measured forces on existing rides. Data is generated on how much weight will be amplified by the G forces created as the cars dip through steep valleys or swing rapidly around tight curves.

"Imagine that these moving vehicles, weighing about 15,000 pounds each, are traveling at speeds of 60 to 70 miles per hour," Furia said. "A tremendous force is being generated in a very short time — forces of 4 to 5 Gs on this 15,000 pounds. Suddenly, in specific areas of the ride, you have nearly 75,000 pounds of force being exerted on the structure."

A roller coaster takes shape, guided by the nimble fingers of Dennes Furia, a structural designer at Ruth and Going, Inc. of San Jose, Calif.

Although the use of computers allows a very precise analysis of the structure of such rides, computers were not always available; Ruth & Going formerly did the analyses manually.

"Everything was so over-designed it was unbelievable," Furia recalled "For example, say you put in a telephone pole when you could just as well put in a two-by four in building a house — that's the type of thing they were doing.

"They were overkilling it, making it too strong for what they needed," he explained, adding that computer analysis guarantees safety while saving money all around.

While some rides cost as much as $4 million to $5 million, a computer analysis costs only about $400 to $700 per run.

More critical than cost, however, is the time saved, according to Furia. Ruth & Going needs structural analysis data quickly because deadlines must be met to satisfy construction and developer clients.

After Arrow's complex process of designing a ride, which takes almost a year, is completed, Ruth & Going does a complete analysis in about a month. After that, it takes one to two years to build the ride.

Ruth & Going has an Applied Digital Data Systems, Inc. Model 70 keyboard terminal and a keyboard terminal from Anderson-Jacobson, Inc., both of which can be used to load data into the system. It uses a Tektronix, Inc. Model 4014 graphics terminal furnished by McDonnell Douglas to generate actual models of rides using Fastdraw.

Ruth & Going accesses McAutonet, McAuto's national communications network, on a time-sharing basis. "We would rather work with a remote service, getting what we need, paying for what we use," Furia explained.

"You can't be an expert in all fields," he added. "Our company employs engineers, not DP programmers."

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EFT Policy Problems Set As Subject of Symposium

WASHINGTON, D.C. — Critical policy choices facing private sector and governmental participants in the development of electronic funds transfer (EFT) services will be analyzed and discussed at a symposium here March 13, sponsored by the Electronic Money Council (EMC).

Fifteen experts will examine various aspects of EFT's future in three formal presentations and three panel discussions at the day-long symposium, to be held at the Shoreham Americana Hotel. There will be an opportunity as well for an informal dialogue between the speakers and attendees, an EMC spokesman noted.

The opening speaker will be Orin S. Kramer, the White House Domestic Policy Staff's associate director for Housing and Urban Development, who is supervising the Administration's review of the McFadden Act.

A luncheon address will be delivered by Lawrence Connell, administrator of the National Credit Union Administration.

Also speaking will be Dan DeSimone who, as deputy director of the Office of Technology Assessment, serves as a key adviser to the Congress on legislative considerations involving technological development.

"The Role of the Federal Reserve in the Payments Mechanism" will be the subject of the first panel discussion.

The symposium's registration fee is $125 for EMC members and $175 for nonmembers. The fee covers all business sessions, luncheon and cocktail receptions.

Registration forms can be obtained from EMC at Suite 1400, 1 E. Wacker Drive, Chicago, Ill. 60601.

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Report Finds 'Technocratic Elite' in User Cities

By **Brad Schultz**
CW Staff

IRVINE, Calif. — City governments have computerized data banks to "increase the rationality and decrease the uncertainty" of policy-making. But the process has allowed "technocratic elites" to dominate policy analysis in cities where elected officials and top managers do not participate in systems design.

That is one conclusion of the Urban Information Systems (Urbis) Research Group's two-year study of computing in 42 U.S. cities. A Public Policy Research Organization project funded by the National Science Foundation, the Urbis study found that when a city relies on automated data banks to make or evaluate policies, computing-oriented personnel tend to acquire an unexpected degree of power.

Hence, an elite develops that is largely unaccountable to the public.

Elected officials and department chiefs can offset this trend by playing active roles in systems implementation because their actions are regularly reviewed by the city council, citizens groups and the press. But those in the public eye that lack technical expertise can also mismanage implementations, Urbis said.

Gaining Clout

The so-called technocratic elite is comprised of planners, management analysts and other professionals with a technical background who advise a city's mayor, chief executive officer (CEO) or agency chiefs.

According to Urbis, this elite gains political clout as automated data banks proliferate or grow in size or as data storage methods become more complex. In many cities, public officials reportedly do not realize that the transition to automated data banks deprives them of power by allowing the elite to establish the methods of high-level decision-making as well as the methods of judging whether policies are successful.

Urbis drew a distinction between data banks, which are primarily involved in storing or retrieving data, and "operational data systems," which are primarily used to perform operations on data (such as computations). Both data banks and operational data systems may be either manual or automated.

Third in a Series

During the past 15 years, U.S. cities have come to rely on computerized reservoirs of data in the setting and evaluating of policies. Do automated data banks really allow local governments to respond more effectively to the public's needs?

Maybe not, as this third installment of *Computerworld's* series on city computing explains. The series is based on *The Management of Information Systems: Implementation Policy for Computing in American Local Government,* a report by the Public Policy Research Organization's (PPRO) Urban Information Systems Research Group that will soon be published as a book.

To learn how to obtain copies of the report, contact Kenneth L. Kraemer, c/o PPRO, University of California, Irvine, Calif. 92717.

During the past five years, the cities with automated data banks surveyed by Urbis produced an average of 21 basic reports and 17 "special analyses," while during the same period Urbis cities without automated data banks produced an average of only six basic reports and four analyses.

At each city in the Urbis study, administrators were asked how they viewed the quality of reports generated by data banks. Two-thirds of the cities with computerized data banks expressed praise for data bank-supported reports, while 83% of the unautomated cities praised their data bank reports.

Both 17% of cities with and without automated data banks were evenly divided (neutral), Urbis stated. None of the unautomated cities complained about data bank-generated reports, but 17% of the automated cities did.

Moreover, mayors or CEOs and councils in cities with data bank automation believe planners' reports based on data banks are biased, while mayors, CEOs and councils in cities with manual data banks regard such reports as impartial. The planners themselves agree with the high-level consensus in each case, Urbis observed.

"Overall, a significant proportion of city councils (18%), mayors [or CEOs] (11%) and managers (17%) have little or no confidence in the accuracy and validity of data bank analyses," Urbis concluded.

Data Bank Subjects

"Very few cities have data banks related to social planning concerns of health, social welfare, employment or crime," Urbis stated. Instead, the 42 cities were said to be more concerned about physical development: the most commonly automated data types are therefore housing, land use, business trends and transportation.

The "rarest" data banks are the most likely to be automated in a city government, Urbis continued. Most Urbis cities have automated data banks only where the transformation seemed to be urgently required and only to the extent deemed necessary.

Some cities, however, have reportedly computerized their data banks as fast and as extensively as possible. These cities have highly sophisticated installations with on-line applications, data base management software, large core memory capacities and the latest in operating systems.

Cities with the most sophisticated DP equipment tend to have developed the most data bank applications, Urbis added.

Management Tool

Roughly one-third of the Urbis cities have five or more automated data banks; about 53% have one to four, while 14% have none at all.

Most urban data banks primarily function as management tools, Urbis said. In this capacity, the most common data bank application is to support the preparation of grant proposals and applications for federal and state financial assistance.

Urban planners in about 80% of the Urbis cities use data banks in community analysis; needs assessment; community planning for land use, housing, transportation and social services; and strategic planning for physical development and social services, Urbis reported.

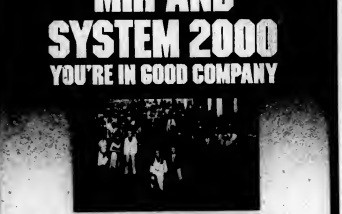
Urbis Recommendations

Urbis found that automated data banks are most effective in supporting policy analysis in cities with many data banks, many applications, a sophisticated DP facility, many types of reports with large distributions and a management orientation in computing.

Most municipal operations, such as police departments, are thrown into turmoil if systems are implemented too rapidly because personnel find it difficult to adjust to changes in procedure, Urbis has noted [CW, Feb. 12]. But data bank-supported policy analysis does not seem to be hampered by fast-paced systems development.

To support policy analysis with automated data banks, Urbis recommended that cities:

- Automate a large number of data banks.
- Develop sophisticated computer installations to support this effort.
- Develop more sophisticated data bank analyses and reports.
- Allow data banks to serve a wide range of uses.
- Centralize computing services, but decentralize the control of data banks.



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Seminar to Cover Office of Future

NEW YORK — A series of one-day seminars designed to prepare the DP professional for the integrated electronic office will be held in six locations throughout the country this month.

"Communications Management for DP Professionals," subtitled "New Career Opportunities in the Merger of Voice and Data," will feature Harry Newton of Telecom Library, Inc. and Jim Gordon, president of TCS Communications Consultants, as speakers.

In presenting a picture of current and future possibilities for DP managers, the seminar will examine such topics as "Opportunities for DP Professionals in Communications Management," "Mismanaged Communications in American Industry Today" and "Recent Developments Changing Telecommunications."

DP, Communications

Newton and Gordon will explain how DP and communications differ and discuss what they feel are "The Nine Elements of Successful Communications Management." They will also tell how to organize a telecommunications department, citing frequent mistakes and ways of avoiding them.

The all-day seminar will conclude with "The Impact of the Computer on Telecommunications" and an evaluation of the "Integrated Electronic Office."

The seminar is scheduled for March 8 in Seattle, March 9 in Los Angeles, March 13 in Kansas City, March 14 in Chicago, March 20 in Boston and March 22 in New York City.

The fee for the course is $80 per person and $50 for each additional person from one company, payable in advance. The cost includes the course, a cocktail party and a manual reproducing the 800 slides used in the show.

More information on registration is available from Telecom Library, 205 W. 19th St., New York, N.Y. 10011.

EFTA Slates Forum March 25-27

WASHINGTON, D.C. — Postal service activities, network communications options and public policy problems confronting financial institutions and multinational corporations developing electronic funds transfer (EFT) systems will be the subject of a forum sponsored by the Electronic Funds Transfer Association (EFTA) here at the Capitol Hilton Hotel March 25-27.

The forum's opening speaker will be John Eger, former director of the White House Office of Telecommunications Policy, who will discuss the problems created by developing technology in the rapidly changing communications environment.

More than 20 experts will discuss system network options and public policy issues. A special feature of the forum will be a presentation on March 26 by the Postal Service that will include a discussion of Electronic Computer-Originated Mail.

The second panel, "System Design and Network Options," will cover the technologically possible and practical communications alternatives. The panel will be chaired by John J. McDonnell Jr., former director of technical affairs for the National Commission on EFT and presently eastern regional manager for Tymnet, Inc.

A seminar entitled "Public Policy Issues In Financial Communications: Privacy, Security and Data Protection" will be held Tuesday. The chairman of the panel will be James Howard, former general counsel of the National Commission on EFT and presently special advisor to the National Telecommunications and Information Administration of the Department of Commerce.

The final panel of the conference, "The Message and the Media," will examine and discuss ways to communicate the advantages of EFT through the mass media. The panel chairman will be George Kroluff, former director of public affairs for *The Washington Post* and special assistant to the chairman of the Senate Foreign Relations Committee.

The forum costs $325 for nonmembers and $225 for members of the EFTA. EFTA headquarters are at Suite 502, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

Auditors Honor Bank Official

NEW YORK — Thomas Fitzgerald, director of DP auditing at Manufacturers Hanover Trust here, has been named the 1979 recipient of the Joseph Wasserman Memorial Award.

The award is presented each year by the New York Chapter of the DP Auditors Association to an individual who has demonstrated outstanding achievement in DP auditing.

The chapter's board of directors wanted to honor a practitioner in the field rather than a consultant or theorist, according to chapter president Steven J. Ross, assistant vice-president at Irving Trust Company.

"In the past, auditing has been thought of as a stepping-stone to other positions in a company," Ross said. "But thanks to work by people like Tom Fitzgerald, DP auditing is becoming a profession."

Fitzgerald is a lecturer, writer and organizer of DP auditing education. He has been published in *Edpacs, Internal Auditor* and in government publications.

The award will be presented at a special dinner on June 4 in New York City.

CLA Meeting Today

WASHINGTON, D.C. — Discussions focusing on trade secret litigation, the protection of computer data and various legal problems peculiar to the computer field will highlight the Computer Law Association's annual meeting here today.

The all-day affair will include an analysis of computer-related tax problems, an examination of current issues in government procurement and a review of DP leasing methods and policies. The meeting will also feature a program examining both state and federal efforts to regulate the computer and communications industries.

Speakers at the gathering will include San Francisco attorney Susan Nycum; System Development Corp.'s Bernard Fried; Michael Keplinger special assistant to the Register of Copyrights; and Roger Borovoy of Intel Corp.

Registration fees for the meeting are $35 for members and $50 for nonmembers. It is being held at the International Club of Washington at 1800 K St. N.W.

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The SIGGRAPH '79 Exposition will be held at the O'Hare Exposition Center in Rosemont, Illinois, August 7-9, 1979. The Exposition is being held in conjunction with ACM's Special Interest Group on Computer Graphics Conference (SIGGRAPH '79), IEEE's Pattern Recognition and Image Processing Conference (PRIP '79) and ACM's Special Interest Group on Personal Computing Conference (SIGPC '79).

What's happened to "the right to be let alone?"

Brandeis called it "the right most valued by civilized men." In today's computer age, it is rapidly disappearing. Covering all the technological and legal aspects of the problem, the editor of *Privacy Journal* has now written

"one of the most helpful books I have read this year—a book you cannot read without discovering how endangered is your right to be let alone and what you can do to shore it up."—Bill Moyers.

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Locked Users Into IBM Disks

Ex-IBMer Testifies FTP Devised to Oust Rivals

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM apparently intended to squelch competition in the disk systems business when the firm instituted its Fixed-Term Plan (FTP) almost eight years ago.

That revelation emerged last week at the Transamerica Computer Co. vs. IBM antitrust trial when Brian Cunningham, an ex-IBM programmer, described a May 1971 meeting at which IBM officials discussed the leasing plan's expected impact on disk systems suppliers.

At that meeting, officials of IBM's San Jose, Calif., research laboratory reportedly assured Cunningham and nearly 30 other members of the lab's Product and Business Planning Department that the FTP would force sume IBM rivals out of the disk systems business and severely hamper the competitive efforts of many others.

"The officials said the leasing plan would make it impossible for all the competitors at the time to remain in the [disk systems] market," according to Cunningham, who later left IBM to enter private law practice. "They weren't sure which ones would fall by the wayside, but they felt . . . by the third quarter of 1972 there would be fewer competitors around."

Cunningham also qooted the meeting's leaders as saying the FTP would effectively "prevent a competitor from offering a competing product to the IBM, particularly the 3330 and other installed file products . . . and would keep a competitor out of the competitive marketplace."

Offensive Weapon

Under questioning by Transamerica co-counsel William Riley, Cunningham left little doubt that IBM intended to use the FTP as an offensive weapon against rival disk system suppliers. At one point in his testimony, he quoted Merle Hague, head of the Product and Business Planning Department, as saying the plan would serve warning that "IBM would strike back and strike back quickly" at any competitor that encroached on the industry giant's disk system domain.

During cross-examination, however, lead defense attorney William Vaughn repeatedly challenged Cunningham's credibility as a witness. He prompted the former programmer to admit he had never performed more than "ministerial" duties in the Product and Business Planning Department. His questioning implied that the witness' role as a "go-for" made him unqualified to speculate about his superiors' motives in establishing the FTP.

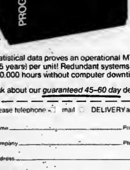
IBM's FTP took effect in June 1971 and represented a significant departure from the firm's usual marketing tactics, Cunningham noted. Under the plan, customers who agreed to keep their disk systems, tape units or printers for two years received a discount of up to 16%.

Although such an agreement would force IBM to temporarily accept a slight cut in earnings, company officials realized the plan's advantages far outweighed its disadvantages. Because the FTP imposed a "severe" penalty on customers who prematurely replaced their peripherals, it effectively "locked users into IBM" for at least two years and sometimes longer if they chose to renew the agreement, Cunningham explained.

For manufacturers of plug-compatible disk units, then, the FTP amounted to a two-year embargo on all their sales to IBM equipment users, and many IBM competitors apparently suffered.

Memorex Corp., for example, sustained significant disk systems sales losses during the months following the FTP's announcement. In fact, the firm's losses proved so great that in late 1971 they reportedly prompted one of Cunningham's superiors to observe, "The future doesn't look bright for Memorex, and I'm glad I work for IBM."

Of course, the plug-compatible firms could have tried to meet IBM's challenge by cutting their prices about 10%. But in an industry where competitors already sold their disk systems for 10% to 15% less than IBM, a further price cut would have reduced profits to practically zero, Cunningham said.



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Witness Says IBM Tacked New Faces on Old Products

By a CW Staff Writer

SAN FRANCISCO — Transamerica Computer Co. has kept hammering away during the last two weeks of its antitrust trial against IBM at one of its central themes — that IBM tried to stifle competition in the computer industry by making minor changes to old products and then reintroducing them with new model numbers.

Transamerica also introduced internal IBM documents that showed the industry giant considered using long-term leases as a possible means to "contain" its competitors.

Under questioning from Transamerica lead attorney Richard Lucas, consultant Dennis Willard told jurors that IBM's Model 3420 tape system differed "only slightly" from the firm's earlier Model 2420 tape unit. Both systems consisted of almost identical parts, offered the same bit density and operated at the same speed and data rate, he said.

In fact, the 3420 and 2420 reportedly resembled each other so closely that Willard questioned the need for different model numbers, he testified.

The consultant later seemed to retract some of his testimony, however, when he admitted under cross-examination that the 3420 incorporated more advanced logic circuitry and offered faster start and rewind times than the 2420. IBM counsel also forced Willard to admit the 3420 and 2420 provided different recording modes and tape-handling mechanisms. The defense attorneys pointed to these features as evidence that the two tape units substantially differed in design.

Similar in Design?

In other testimony, Willard described IBM's 2401/8 tape unit as basically similar in design to the firm's previously announced 2401/2 system. The 2401/8 originally entered the market as a 7-track-only unit, whereas the 2401/2 offered both 7- and 9-track recording.

IBM, however, later removed the 9-track capability from the older model and added it to the newer system, Willard reported. In other words, the firm spent large sums only to diminish the earlier system's performance — a move the consultant described as highly "unusoal" for the industry giant.

IBM counsel responded to Willard's testimony by trying to raise doubts about the extent of the witness' knowledge of 2401 series systems. The defense also forced Willard to concede that he had not studied the 2401/2 and 2401/8 extensively enough to know whether the two models significantly differed in internal makeup.

IBM Memos Produced

After the consultant left the witness stand, Transamerica attorneys produced IBM memos that urged implementation of long-term leases even though such a move might have undesirable financial consequences.

In one such memo, dated June 1969, IBM Vice-President and Corporate Controller P.J. Rizzo told Senior Vice-President J.R. Opel, "If we long-term lease . . . we will do it on 'guts' and not on any analysis. Nonetheless, 'assuming that all oor competitors are doing it, I am inclined to favor a move in this direction on our part as part of another aggressive action. The issue would be one of containment."

In another memo, dated January 1971, IBM Director of Marketing Development J.E. Justin advised against adoption of long-term leases, but apparently reflected a similar "containment" mentality. "We should stay with the current rental plan as long as we have assurance of strong product and technological leadership," he said.

"If the product strength is not there, the price cuts or different rental plans may be necessary and therefore we will need to bring our cost in line to the cost of OEM. Overall conclusion: continue current rental plan. Determine if technology and products in plan will contain OEM," the memo advised.

Looking for a Teacher of West Armenian?

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — When Stanford University realized it couldn't afford a full-time instructor for its introductory course on the West Armenian language, the school opted for a computer system as a substitute teacher.

Still under development at Stanford's Institute for Mathematical Studies in the Social Sciences (IMSSS), the system will perform the same classroom duties as a human instructor when it becomes fully operational this September.

With its 512K-byte digital Equipment Corp. PDP-10/KI-10 mainframe, the system will teach a handful of Stanford undergraduates almost all the basic skills — spelling, vocabulary, grammar and syntax — necessary to master West Armenian or any other language. The system will even evaluate students' classroom performance periodically and issue final grades at the end of each quarter.

In short, the computer will oversee nearly every phase of the Armenian course with little or no outside supervision.

The only language skill the system won't teach is pronunciation, which students will learn in a weekly drill-and-practice session with human instructors.

Voice Synthesizer Included

In operation, the computer will simulate nearly all the elements of a conventional classroom lecture, according to Lawrence Markosian, an IMSSS research associate who participated in the system's development. Instead of relying on blackboard and chalk, the system will present written lesson material with an Imlac Corp. PDS-1 CRT terminal.

The spoken portion of the lesson will emanate not from a human instructor, but from a voice synthesizer, which will draw its material from digitized speech prerecorded on 20M-byte disks.

During a typical lesson, the terminal and voice synthesizer will operate simultaneously so written and spoken instructions will coincide, just as in a conventional classroom. After explaining an element of the West Armenian language — a letter in the 38-character alphabet, for example, or the conjugation of a verb — the system will ask a student to repeat the lesson from memory by entering his responses on the terminal's keyboard.

If the student answers correctly, the system will proceed to the next item in the drill-and-practice sequence. If the student makes a mistake, the system will immediately correct his answer and repeat the procedure until it receives the appropriate response.

If a student wants to skip lessons he has already mastered or repeat material he has forgotten, the system will have the flexability to accommodate his wishes.

Anticipated Benefits

In this way, the system will reportedly allow students to receive more personalized instruction and provide more leeway in structuring classroom activities than conventional forms of language instruction, Markosian said. It will also permit students to learn at their own pace and absorb material faster than in an ordinary classroom.

Because of these anticipated benefits, Markosian has concluded that the Stanford system will soon lead to significant advances in the quality of West Armenian instruction.

Indeed, without the system, Stanford would probably never have consented to offer the language course in the first place. After all, what university can afford to carry a class that seldom attracts more than one or two students each year?

Long CAI History

Another important factor that contributed to the course's approval was Stanford's long history of involvement in computer-assisted instruction (CAI). That involvement began about 12 years ago, when Dr. Joseph Van Campen of Stanford's Slavic Languages Department demonstrated the feasibility of teaching undergraduate Russian with a 21K-word PDP-10 system then at IMSSS.

To implement the course, they merely had to tie into the IMSSS' existing PDP-10 and develop programs that could run under the system's Tenex time-sharing operating system.

So far, efforts to complete development of Stanford's latest CAI experiment have progressed approximately on schedule. One of Markosian's colleagues, research associate Hasmit Seropian, has already written some of the system's drill-and-practice sessions, and the remaining lessons are expected to follow in fairly short order.

Seropian's work is reportedly being simplified by her use of the voice-oriented Authur langage, which permits even inexperienced users to write computerized classroom lessons.

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In Grants to Rural Communities

System Helps Agriculture Distribute $5 Million

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – At the same time several hundred angry farmers surrounded the Agriculture Department headquarters here with tractors and filled the air with unpleasant imprecations aimed at Secretary Bob Bergland, a quiet revolution was overtaking the department from within.

In the department's Farmers Home Administration (FMHA), a group of employees are using computers to make the agency's programs more responsive to farmers and their rural communities.

One automated system, said by the FMHA to be the only one of its kind, is helping the government distribute $5 million a year in grants to small communities. The Area Development Assistance Program is making funds available for such purposes as job training and land management programs, development of community health facilities and even energy conservation and historical preservation.

For about $10,000, FMHA, working with a local time-sharing company, developed a management information system that tracks the funds applied for and granted under the assistance program. According to Paul Kugler, assistant FMHA administrator, the system is not only inexpensive to use, but also saves communities money because it allows them to easily determine what funds are available.

The system cuts down on waste because communities are not asking for grants under programs already out of money, and money is not left unspent because nobody knows about the programs. In addition, the system makes administering the assistance program much more efficient and economical for his department, Kugler said.

Simple Reports

A series of simply formatted reports are printed out on a regular basis for program administrators and, on request, for members of Congress checking on the progress of grants sought by constituent communities, the communities themselves and for anybody in the general public.

The reports are produced using an AT&T Dataspeed 40/2 workstation, which Kugler called "the best unit I've ever used." The data is stored by the time-sharing firm and accessed at $6 per hour by dial-up line.

The only access station is in Kugler's office and consists of one CRT terminal, 300- and 1,200 bit/sec modems, a high-speed impact printer and a tape cassette data storage unit. The equipment rents for about $600 a month.

By keeping the system simple and the amount of data stored to a minimum, the department keeps administrative costs very low, Kugler said. All the information in the data base is entered by one secretary and is backed by manual files that can be accessed quickly – more quickly and inexpensively, Kugler said, than if the information were computerized.

Besides the periodic reports to FMHA administrators which show the amount of money applied for and granted, the system also shows how many applications for grants have been received and where they are "in the pipeline." According to Kugler, this last point is the most important, because it saves communities from wasting their time applying for heavily subscribed grants.

The system also produces a number of internal "tickler reports" that allow Kugler to watch the progress of grant applications, monitor the amount of work his employees are doing and make sure nothing is lost in the bureaucratic shuffle.

While he runs a "friendly shop," Kugler pointed out that if an employee needs incentive, a computer printout is a good way to provide it. It cuts down on personal conflicts between manager and employee because "you can't argue with a printout."

Best Aspect

But the best aspect of the system, he said, is that it allows the public to see how tax dollars are being spent – at very little cost to the government. "All this information ought to be available to anyone in the public," because it involves expenditures of public money, Kugler declared.

He estimated his office can produce a printout and mail it off for less than $1, compared with an estimated $10 per letter. The office receives about 100 requests for information on grant applications status every week.

Kugler was recently cited for "outstanding achievement" by a federal DP group for his work in developing the Federal Assistance Programs Retrieval System (Faprs), through which a community can quickly find out the federal assistance programs for which it qualifies. He said he is eager to share the technology he and his co-workers have developed.

"It is part of our responsibility when we take on this kind of leadership role to make the technology available to others," he noted.

Kugler hopes one day to see this type of management tool in widespread use in the government. "All of the government ought to have one standardized management information system, and it ought to be compatible with everyone else's so everyone can use it.

"Although there may be better systems around, we're vain enough to think our system is the way to go," he said.

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Prospective authors are invited to submit a one-page abstract in English as soon as possible. Final manuscripts will be required by May 15.

Abstracts should be sent to Dr. Robert L. Schiffman, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Colo. 80309.

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Abstracts (two copies) are due April 1. Completed papers, tutorial outlines and case study outlines (three copies) are due May 1. They should be mailed to John Bongiovanni, Air Force Data Services Center, Room 1D988, The Pentagon, Washington, D.C. 20330.

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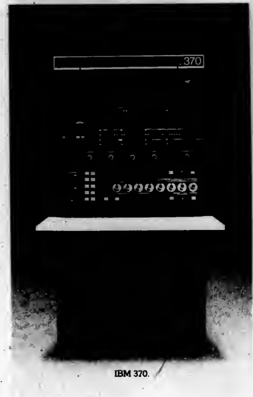

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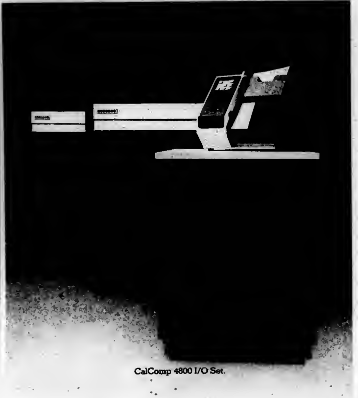

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User Builds Software to Track Employee Health

By Marcy Rosenberg
CW Staff

CLEVELAND — To cope with federal health-reporting regulations and environmental standards, an oil, gas and chemicals company has developed a computer-based surveillance system to determine how and if the work setting affects its employees' health.

The developer, Diamond Shamrock Corp., plans to license the Computerized Occupational Health Environmental Surveillance System (Cohess) to firms in the pharmaceuticals, steel, auto and other industries that must meet government environmental regulations.

Cohess is a documented software package that codes, stores, correlates and allows fast retrieval of employee medical statistics and information on working conditions, according to Hansford Boutchyard, Cohess manager at Diamond Shamrock. The system performs two functions: It examines group trends and changes to detect potential work-related health hazards in time for early correction and it monitors the general health level of individual employees.

To accomplish this, the system uses reproducible grids to evaluate over time employee health information in terms of workplace location and the chemicals, processes or agents present at those sites, Boutchyard said.

Worker health data is obtained from preemployment and annual physicals plus special examinations and medical tests required by the Environmental Protection Agency and other regulatory bodies.

Runs on Mini

Cohess was designed to run on a 120K-byte Datapoint Corp. 6600 minicomputer. It requires a minimum of 40M bytes of disk storage and an IMS-type data base, which Diamond Shamrock maintains on an in-house IBM 370/158.

Since Diamond Shamrock wanted to limit data access to its medical staff, "we decided it would be cheaper to process and massage data on a mini than to use the company's mainframe on a time-sharing basis," Boutchyard recalled.

Cost and performance considerations led the firm's medical department to select Datapoint hardware for Cuhess. A benchmark run on the 6600 and two undisclosed mini vendors' systems showed the 6600 wrote and compiled prugrams faster and cost between $200 and $500 less than the other equipment, Boutchyard said.

Medical staffers input data via CRT terminal to the minicomputer system, which edits and processes information on-line using Datapoint's Datashare interactive software. Boutchyard noted that data can also be entered by key-to-tape, key-to-disk or tape-to-tape.

The minicomputer stores edited data on a transaction file, which is then transmitted to the host IBM mainframe for disk storage and batch retrieval within 24 hours.

Scrambled for Privacy

To ensure that employee medical data is kept confidential, Cohess uses scrambled Social Security numbers to identify workers. The system also provides a Data Element Dictionary that assigns a 14-character alphanumeric input code, called a D-number, to each element in the data base.

Output is triggered through a screen-driven program that allows for a "fill-in-the-blanks" approach to questions. For example, to query the system to find all employees whose blood pressure (BP) readings are above a certain level, an operator would key in the D-number for diastolic BP and an identifier fur the desired level. Diamond Shamrock uses a 600 line/min Datapoint printer for hard-cupy output.

The firm will license Cohess to other users for $250,000. That price includes software documentation, installation and training on how to input, output code and grid plants and identify chemicals in plant locations.

While users must provide their own hardware, Boutchyard did note his firm recently became Datapoint's Cohess representative. "We recommend Datapoint equipment and will receive a commission if a Cohess customer orders Datapoint hardware through us," he acknowledged.

For small businesses that do not have a mainframe with an IMS data base, Diamond Shamrock will consider time-sharing arrangements to store and retrieve customer data on its own computer, he said. "We would first have to iron out a lot of bugs relating to privacy issues," he admitted.

Diamond Shamrock is at [illegible] Superior Ave., Cleveland, Ohio [illegible].

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Editorial

Disturbing Questions

H. Ross Perot's latest adventure [CW, Feb. 26] made interesting reading and would even make a good movie, but the story raises some interesting questions about the U.S. government.

In brief, Perot reportedly mounted an armed commando attack inside Iran to free two engineers who worked for his Electronic Data Systems Corp. (EDS) there. They were being held in prison for ransom, Perot said, so EDS would return to Iran and restart the computer systems it operated for the government before the recent civil war. The Iranians said the two were being held because of contract irregularities and bribery.

Most Americans were heartened by the Perot operation, particularly since public mention of it came shortly after the U.S. Embassy in Tehran was invaded by local leftists.

Despite the derring-do of the operation, however, it is questionable just how far a private firm should go in protecting its employees around the world from such actions. But the whole episode raises questions about how much protection U.S. businesses and business — people can expect from the U.S. government when operating abroad.

For years, the government encouraged the export of computer equipment and services to Iran, but Perot claimed it offered no help in obtaining the release of his people there after they were arrested. Clearly the government has an obligation to help U.S. citizens in such areas — particularly when it has encouraged their presence.

While illegal interference in the affairs of other countries by private companies can never be condoned, neither can the inaction and failure of will apparently shown by the U.S. government in this case.

Not Glamorous, Necessary

Supplies and accessories are areas for savings that are often overlooked by DP managers, largely because they are not as exciting as new computer or operating systems.

And yet the price of paper and other supplies continues to rise and take an ever increasing share of the typical DP budget [CW, Feb. 26].

Many steps can be taken by the typical data center manager to help reduce the costs of such supplies — and many of those steps are relatively easy.

With the increases in paper prices predicted for this year, all users should take this opportunity to study their operations and determine where savings can be made. A careful examination of all the printed matter leaving a shop may not only show ways to cut paper costs, but might also identify unneeded reports that could be eliminated, also reducing the processor workload.

The project may not be as glamorous as evaluating new CPUs, but it offers the same potential for dollar savings. All professionals should conduct such periodic reviews to eliminate waste and duplication from data center operations.

Data Past

Five Years Ago
March 6, 1974

WASHINGTON, D.C. — Vice-President Gerald Ford was tapped to head President Nixon's top-level review of the entire issue of personal privacy — particularly in relation to computerized data banks. The review committee, made up entirely of Administration functionaries, was told to design "a personal shield for every American" against invasions of his privacy.

— — —

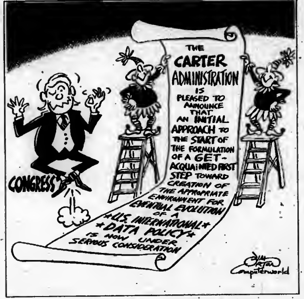
DES MOINES, Iowa — Des Moines police maintained a computerized list of persons they suspected — but couldn't prove — were guilty of crimes. Assistant Chief Billy Wallace argued that police needed to maintain computerized data on suspected criminals because "there are people walking around out there who are guilty but have never been convicted." Wallace said prohibiting the practice would hamper law enforcement.

Eight Years Ago
March 10, 1971

OAKLAND, Calif. — Police armed with a search warrant raided a University Computing Co. (UCC) service bureau in Palo Alto, forcing UCC to duplicate all its tapes and punched cards and to dump disk packs and core, which they then impounded. A UCC employee was then charged with grand theft. Police said he had tapped Information Systems Design's Oakland computer to steal a proprietary program.

— — —

Although most independent peripheral users enjoyed the benefits of lower rental costs, they often gained technical features not found in comparable IBM units, a survey found. The list of improvements included disk drives with faster access times and higher track densities, printers with higher rated speeds and tape transports with mechanisms that moved the tape without touching it.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CONGRESS
Jim Ortan
Computerworld

Letters to the Editor

Use Modified Form

The basic concept outlined by Lowenthal in "Data Base Processors Seen as Building Blocks" [CW, Feb. 19] could be used in a somewhat modified form by perhaps 90% of all business systems.

However, the data base processor should be used as a front end. Just about any available micro could be used as a back end for doing calculations.

Microprocessor manufacturers must know that the ratio of data base/calculation processing in business systems is somewhere in the 90:10 range. Why do they design processors with their best capabilities in reverse?

Henry Keultjes
Mansfield, Ohio

In Search of Problem

Viewdata faces other problems besides those mentioned in "Major Obstacles Block Viewdata Use in U.S." [CW, Jan. 22]. Viewdata is a solution in search of a problem. It isn't needed, and it isn't economically viable.

As noted in Portia Isaacson's column in Datamotion, the home microcomputer is cheaper than the Viewdata TV and keypad combination and offers local memory and computing. It makes no sense to pay more to get less.

The Viewdata display is just a TV set with some logic, which permits it to act as a rudimentary terminal, and a built-in modem with an auto dialer and identification number.

It would appear to be far more cost-effective to start with a home microcomputer that could run languages and applications and access computers other than Viewdata's. More than Viewdata retrieval should be available.

W.B. Adams
Bethesda, Md.

Strenuous Objection

Kenniston W. Lord's "United California Bank Blames Jam on Computer" contained some important points [CW, Jan. 22]. I very strenuously object to the statement in reader F.J. Bridge's letter that "Lord's only significant sentence in the piece was the question 'Do we tilt at windmills?' " [CW, Feb. 5].

Bridge should have considered to whom the brochure was sent. The bank sent the communication to its customers; not to professional DP personnel. While members of the DP community may appreciate the tongue-in-cheek tone of the brochure, most people outside the DP community feel uncomfortable with computers and may well be misled by such statements.

I teach courses in introductory DP at the adult education and community college levels. More than 95% of my students show a fundamental misunderstanding of how computers are programmed and how errors come about in a computer system.

Outside the DP community, there is a mystique about computers; they are viewed in human-like terms. Statements such as the ones in the bank brochure only serve to reinforce this impression among members of the general public.

Moreover, reader Bridge should have considered who really is to blame. No matter where such an error occurs, whether in programming, operations or data entry, professional DP personnel should be willing to say, "We goofed. We will correct the mistake."

Such an attitude will go a long way toward increasing the credibility of the DP department among other departments in a company. Using the computer as a scapegoat because it cannot defend itself is childish and self-defeating.

Jack E. Cole Jr.
San Diego, Calif.

White Hat, Black Hat

Does Anyone Care What Happens to NBS?

By Dr. Herbert R.J. Grosch
Special to CW

One of the most important interfaces between the computer user community and everyone else is the shop I once ran at the National Bureau of Standards (NBS). The U.S. government is by a factor of 4 or 5 the world's largest customer for data processing and computing equipment, the runners-up being the Bell System (if considered as one entity) and French and Japanese national corporations (ditto, respectively).

The government is by a very large margin the most powerful nonmanufacturer voice in DP and communications standards — and, although I won't mention it again, in office machines and word processing standards as well. The government sends computer representatives to international bodies like the Organization for Economic Cooperation and Development (OECD), and they defend hardware and software manufacturers, service organizations and American multinationals against incursions (the transborder data flow hubbub comes to mind).

Because of the Brooks Act, dating back now 13 years, the Department of Commerce and, unfortunately, its Bureau of Standards, helps the Office of Management and Budget in DP policy matters, including the recent major but so far abortive effort at federal DP reorganization. It helps the General Services Administration (GSA) in procurement, which nevertheless gets slower and clumsier every year, and literally drives away many small young supplier companies. It sets government DP standards — ah there, Ascii — and is the central representative from Washington in national and international DP standards committees.

Importance of Institute

At NBS, the work — if you will pardon the euphemism — is carried out in the Institute for Computer Sciences and Technology (ICST), which in my time reported to the bureau director as one of the four line operations at NBS. I and my successor, the formidable Dr. Ruth Davis, were representatives to OECD computer activities and — often muffled by the horrid State Department — to other international DP groups.

So ICST and its director are important to the Brooks Act and to the attempt to improve the effectiveness of the $6 billion or more the Feds spend every year on computer work; important only slightly less directly to the whole American DP scene; at least uniquely placed with regard to intergovernmental and international organizations.

The shop which is now ICST started under Norman Ream as a superdivision or a subinstitute at NBS in 1965. It encompassed six of the NBS divisions (I later shut down one), but was in a mezzanine relationship, within a large institute — and it was called Center, not Institute. Norm lasted less than a year and fled to the Navy Department. He had no PH.D. and hence was considered subhuman by the physicists and chemists who have run NBS from its inception 60 years ago.

And the computer people, who did not muster many doctorates themselves, attacked him from behind because they loved Sam Alexander, father of Seac and Swac, whose failing health had ruled him out for the Brooks Act spot. Messy!

No Takers for the Job

Well, there was an interregnum of more than a year. A committee headed by Cuthbert Hurd — yes, the one who was on the Edelstein hotplate for five weeks recently, telling how the IBM 701 was marketed and priced — scraped every barrel in sight.

No one would take the job; Ream's wounds, resembling those of Julius Ceasar in Shakespeare, "like dumb mouths [did] ope their ruby lips" — the operative word is "dumb" — warned everybody off.

Finally, at the very bottom of the very last barrel, way out in lovely Santa Barbara, they found me. There had been, I repeat, more than a year of nonmanagement. No standards had emerged, the staff was demoralized, the budget was a morass. But I had been amply warned, by friends inside, indirectly by Norm himself and by outsiders. So I wasn't shocked or hurt.

I tidied up the finances and the organization chart. With Jack Brooks helping, I got the director to move the center up to a direct report. A few measly standards emerged, and I started Fipspub, the federal information processing standards series.

Then Nixon came in, and an old enemy of mine was appointed Assistant Secretary of Commerce, and Lew Branscomb — now Chief Scientist of IBM — took over NBS. Besides, I'd lasted almost three years, and on purely statistical grounds was bound to collect a spear in the belly pretty soon.

I advised GSA not to let Uncle Sam have any System/3s — "a slap in the face for the Federal and national standards effort" — and, boom, I was the ex-director. Director demeritus, I called myself.

Improved Relations

There was another interregnum, almost as long as before. But I was lurking about, up on a pretty cushy shelf. The operation had been in fairly good shape when I was removed. So things weren't too bad.

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The Taylor Report

User Checks Can Fight The Junk Mail Nuisance

By Alan Taylor
Special to CW

The problem of illegitimate output — computerized junk mail, for example — touches everyone, from those of us who design output forms to users to the general public.

The user should be able to perform some checks to prove the output is genuine. This should be a system analysis *requirement*, not an optional public relations gimmick. These checks apply only to legitimate output and shouldn't be wasted on junk mail.

Typical types of checks that should be included in computer output include separate sets of figures to demonstrate the accuracy of computed forward-balance items as well as explanations and examples of algorithms that were used — especially for computations of finance charges since they vary with the amount of prior balance.

The user should also be informed how he can get additional information and how to challenge any facet of the output. Such checks will restore users' faith in good output.

I recently received a piece of computerized junk mail informing me that as a U.S. veteran who was honorably discharged, I was entitled to a beautiful golden medallion. Now it's true I was honorably discharged — but from the British, not the U.S. army.

I wondered how my name got on a list of U.S. veterans. After contacting the firm, American Veterans Group Insurance Trust of Valley Forge, Pa., I found that the firm didn't know when the list with my name on it was joined to the letter.

It had even built a safeguard into the system design; one of the enclosures in the envelope sported a small, red stamp that read, "If you are not a veteran, please pass this on to a friend who is."

Well, you can't blame the computer since it was in a sense blindfolded. The system was simply told to assume that both inputs were genuine.

But the standard letter should never have been matched up with just any list. And items such as the gold-embossed identification card, false evidence of my status as a U.S. veteran, can only increase the public's distrust of computerized mail.

While in this case the firm is to

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The Human Connection

DDP Offers Way to Train Systems' Real End Users

By Jack Stone
Special to CW

Yet another gaggle of gurus has gathered to "tackle the far-ranging problems" of distributed data processing (DDP) and "offer insights and solutions to them."

This latest occasion was the roundtable on "Implementing DDP Successfully — Part I," sponsored by *Computer Decisions* magazine and excerpted by John Seaman for its January issue. What struck me as unusual about this panel of users, vendors and consultants was not the enlightenment but the confusion that was apparent, even though DDP has been around in one form or another for years.

So I thought I might have a go at clarifying certain aspects of the issue by commenting on several of the more interesting remarks of the panelists:

- *On the definition of DDP.* One speaker said, "It's like pornography. We can't define it, but we know it when we see it." Another noted, "I think I know some elements that ought to be in the definition. I must see the word(s) 'communication' . . . 'networking' and . . . 'commonality.' "

Isn't DDP, in a general sense, a term we use merely to characterize a broad class of systems that employ computing capabilities remote from a central processing facility? Then — to distinguish DDP from such configurations as multiple stand-alone processors whose data tapes are sent through the mails to a central site — we should toss in the constraint that the remote stations be tied together and/or to the central site through a data communications network.

The problem, of course, is not with the definition of DDP, but with its application in the social-political-psychological environment of large organizations.

- *On the subject of where DDP fits.* One panelist reflected that "if DDP is a major thrust in terms of achieving the strategic goals of the business, then it ought to report to the chairman or the president. If it's technical, on the other hand, it shouldn't report to the top."

Another stated, "I think our definitions show DDP isn't an entity in and of itself. Therefore, it doesn't report. It works. We don't have someone in charge of files or typewriters or adding ma-

(Continued on Page 23)

Reader Commentary

Turi's Right: Objectives First
First-Time Users Buying Systems Backward

By Michael Wood
Special to CW

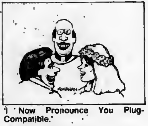
Applause, applause to Leonard F. Turi for "Review Manual Operations Before Buying First System" [CW, Feb. 5]. I find it refreshing to know that there are people out there in DP land who aren't pushing hardware or software packages but instead are trying to help small businesses take an objective look at their organizational and operational information and resource management requirements.

For too long, the DP industry has been working backward, starting with hardware and ending with objectives. The time has come to reverse the process.

I would add to Turi's program, however. For the first-system candidate, I would suggest the following sequence of events:

- Educate management and key personnel in fundamental computer planning and use concepts.
- Have management define the perceived purpose of the computer and the scope of what it might be expected to accomplish for the company.
- Have management define the type of information it needs to make decisions and the methods of acquiring it.
- Have management and related personnel identify the type of control information required to perform the company's coordinating functions and the methods of obtaining it.
- Develop a model of the organization, identifying key functions and function interrelationships.
- Develop functional flows of the organization as well as individual functions such as sales, inventory control and purchasing.
- Identify subjective limitations such as organization, political, environmental and other high-risk areas.

These steps should be taken before the hardware or software is actually selected. Through them, management gains visibility and can objectively evaluate whether a computer will interface to the company.



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If, after this planning phase, the decision is made to pursue an automated approach, then a systems life cycle should be developed for the remainder of the project to be undertaken.

That cycle should consist of a requirements planning phase (identification of all system outputs to be automated); a design phase (complete documentation of what the system will do and how it will do it); a construction phase (programming, hardware and so on); an implementation phase (system made operational); and a use and evaluation phase (feedback examined and new versions begun, if necessary).

Each phase becomes independent of the next when properly sequenced and allows the small business to minimize its risk while maximizing its grasp of the project's scope. The company might find itself stopping at the end of the design phase and deciding to revamp some of its manual procedures and to postpone the major investment and commitment a computer system requires.

Don't laugh. It happens.

An objective and logical approach to system problems is the only way to approach the use of DP in all businesses, large and small.

My hat is off to Turi. This industry needs more management/DP-oriented consultants.

Wood is a certified public accountant with Wilson & Hughes, Inc., certified public accountants, in Thousand Oaks, Calif.

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Honeywell

DDP Offers Way to Train Real End Users

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chines and therefore, we don't have someone in charge of DDP."

Well, it's not DDP but a correctly designed information system that is the major thrust in achieving strategic goals. From a global point of view, it doesn't matter what the system configuration is as long as the user is receiving the most cost-effective service within available technology.

And any resource — "technical" or otherwise — which can directly affect the fundamental success of a firm unquestionably requires that somebody be in charge of it and in a position mighty high up in the management chain.

- *On the greatest obstacle to implementing DDP.* One panelist suggested it was the "lack of management control. The reason DDP sounded like a great innovation is that the economies of scale with large computers just broke down ... So the decision is made to distribute. But ... we lose control again. We give everyone at the remote sites machines, [but not] the methodology to develop ... or control software."

Another panelist took this viewpoint: "One of the reasons you want central control is to try to eliminate redundancy."

What is this issue of central control, really? Is it the control of methodology or redundancy or data? Or is it the control of the monopoly over the technical knowledge required to implement systems at remote locations?

Although I concede that most users have not knocked themselves out to keep their part of the systems development bargain, DPers are not widely known for their altruistic sharing of the myriad gems of DP wisdom, regardless of the reason. It seems to me DDP has given the users a wonderful opportunity — which they are seizing — to get on the DP bandwagon, not for the faddishness of it all, but because of genuine need.

Give Users Their Turn

Contrary to the panelist who espoused central control to avoid the (hackneyed) "reinvention of the wheel syndrome," I strongly favor putting small, inexpensive packaged stand-alone systems out where the users can have their turns at "developing," installing and maintaining their own systems. Let the ignominy of systems failures give them the knowledge and experience they need to participate in successful systems development projects.

After all, haven't most of us learned the business through reinvention and systems failures, but at a much greater price than is necessary today?

Comments on this or any other topic related to the interplay of humans and DP systems may be addressed to Stone at Computer Education International, Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Checks Combat Mail Nuisance

(Continued from Page 21)

blame, the situation does concern DPers for practical reasons. Our systems, with all their checking formats, assume that input, like the list of "U.S. veterans," is accurate. The result is rampant illegitimate output.

Bad Output, Forged Coins

The value of legitimate output is questioned because illegitimate output engenders the public's distrust. Illegitimate output is analogous to forged coins. "Bad money drives out good," the saying goes.

Most of the coins in fact, may be genuine, but the value of the money is still in doubt. What the mints usually do in such a situation is to withdraw the old currency and substitute new currency with distinctive features to assure the user of its value.

Our currency is our output. Our task is the same as that of the currency designer after the public begins to distrust the value of his currency. We must design output that assures the user of its value.

In the past, most analysts have not considered computerized junk mail to be their problem. But now the volume of illegitimate output is immense. We need to incorporate checks for users when designing output forms to assure the public of the output's worth.

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Does Anyone Care What Happens to NBS?

(Continued from Page 21)

Ruth Davis appeared and, in spite of a protective cadre of moderately repellent intelligence-community types she brought with her, settled in rather quickly. Ruth is a superb if rather frightening bureaucrat; she did the briefing-book bit and the staff-it-up-and-down-until-it-wears-thin bit; she got along well with Branscomb.

Relations improved with the rest of NBS; they had suffered from my native intransigence as well as from my open disapproval of the bureau's "dirty secret": that it regarded itself as the national physics and chemistry research establishment and resented the ugly necessities of metrication, fire prevention, building standards and the Brooks business.

Yes, Ruth did better at first, but in the end she fell afoul of the Old Boy NBS Network. Her staff grew restive. And standards progress was even slower than under me, although there were great flurries of paper.

Headless Again

Then came the dawn — or at least, Jimmy Carter. Ruth was a real asset to him — military background, female, scientific degree and already aboard. She was whisked away to the Pentagon, no doubt to her own very great pleasure (and relief).

And there ICST stood: headless again. That was two years ago. No replacement has been appointed. There has been no indication — and I listen hard, you can be sure, and at every keyhole I know — that serious interviews have even taken place.

The search committee — I don't think there was one after I was fired, but remember the Hurd operation in 1966-67 — was only appointed in October 1978, nearly two years after Davis escaped; it is chaired by Vladimir Slamecka of — it figures — Georgia Tech.

Vlad is a very senior figure, but his personal career has been in library science. I've written him — told him this story, offered my help and that of the Association for Computing Machinery. But, I told him, only if Jordan Baruch, the new Assistant Secretary in downtown Commerce, pulls ICST out of the Bureau of Standards. A nice letter came back, then silence.

My insistence involves still another part of the tale. Remember, Branscomb had been director of NBS. He was tremendously intelligent, a major Big Science figure in his own right, clearly in the running some day to head the National Academy of Sciences.

Branscomb left NBS for Armonk and was replaced by an unhappy guy from industry named Roberts. Roberts soon went back to General Electric and shortly thereafter killed himself. And the NBS directorship itself stood vacant, along with that of ICST. What a shambles!

Anyone Listening?

I told Jack Brooks, I told the OMB reorgiasts, I told Baruch (whom I've known slightly for many years) and anybody else who would hold still: get the institute out of NBS. The people at NBS don't want it, their superb scientific laboratory facilities are not needed for the computer work, the atmosphere is all clogged with Ph.Dism and highbrow physics.

But it hasn't happened. My guess is that if Baruch took ICST out of NBS, it would get picked off by Henry Geller, his rival assistant secretary at the National Telecommunications and Information Agency. Since Geller is a lawyer and from the dreary Federal Communications Commission, I'd hate to see that happen. But for ICST to stay in NBS is still worse.

Recently Carter appointed the acting director of NBS, Ernie Ambler, to permanent office. Ambler was head of the Institute for Basic Standards (read "Research") while I was head of ICST.

Ambler is a slow type, especially compared to Lew Branscomb. He is intensely devoted to The Old Bureau — that is, to unnecessary physical science research rather than to technology and standards. During his regime, the big 1100 series Univac has been yanked out of ICST and handed over to Administration, which will use it for data processing and to service the NBS internal computing load. No Brooks baloney, you can bet.

The ICST has been put back to a "center" again, one of a dozen or more — instead of being one of four institutes. The staff is in the doldrums. Nobody downtown seems to care, except maybe Brooks. And Jack is a very senior and important figure in the House hierarchy; he'd like to see his brainchild better treated, but he has all government operations to worry about, including the GSA scandals.

So, nothing goes ahead. And this suits the computer manufacturers fine. It lets the Defense Department zoom along with its unbelievable Ada language. The poor taxpayer, whose money is being squandered, doesn't even know the problem exists.

And the computer users — all of us, in government, across the U.S. and even overseas — we suffer.

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Hardware Interesting, Too

Packages Help Keep System 'Flying'

By Don Leavitt
CW Staff

LOS ANGELES — Many data centers have installed packages and used them with good results, exactly as the designers had anticipated. But now a growing number of users are getting innovative effects from using several packages in concert, sometimes in ways the vendors never anticipated.

Flying Tiger Line, an international airfreight carrier based at Los Angeles International Airport, is one organization that has blended the capabilities of packages. But Flying Tiger has a heritage of innovation: It was founded in 1945 by former fighter pilots who fought for China even before the U.S. entered World War II.

Today the airline maintains a large commercial jet freighter fleet that moves a staggering volume of goods to destinations throughout the world on both chartered and scheduled flights.

Elements of innovation show through in the company's DP equipment. The production workhorses are a pair of IBM 360/65s, one running under ACP, the software used by many airlines for scheduling, and the other running under OS/360 for more conventional applications. A 370/148 has recently been installed to serve as a backup for the Model 65s and as a development system for new programs.

That may seem like an odd backup arrangement, but the Model 148 is running under IBM's Virtual Machine facility (VM/370), which means it can, if necessary, run both ACP and OS-based work simultaneously, according to Craig Ellerbroek, manager of data base administration for Flying Tiger.

The availability of the Conversational Monitor System (CMS) under VM/370 makes the 370 a good tool for the programmers as they build their systems interactively, he added.

Ellerbroek's function is based on another software system acquired from outside. Flying Tiger uses the Ramis data base management system (DBMS) from Mathematica, Inc. Getting ready to use that system involved still another package, DYL-260 from Dylakor Software Systems, Inc.

Kiac Based on Air Bill

The business of operating an efficient cargo-tracking system is, in itself, a major undertaking. Flying Tiger uses a system called Key Information Air Cargo (Kiac), based on the so-called air bill, to do the job.

The air bill is an all-inclusive document that can contain some 450 data items ranging from a description of cargo to its weight to customer information and destination identification. This proliferation of data was the major factor in the company's decision to go to a DBMS, Ellerbroek noted.

Remis was to become the airline's major source of accounting, financial and marketing in-

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Developer Seeking Beta Test Sites Before Offering Dasd Software

SAN FRANCISCO — International Data Processing Services (Idaps) is seeking test sites for a software package called the Dataset Migration Facility (DMF), which manages the use of direct access storage devices (Dasd) and controls available space on these devices.

Idaps is a development firm that normally transfers rights to its products to a marketing organization. Before it transfers DMF to a marketer, however, Idaps wants user evaluations from a limited number of trial installations, a spokesman explained.

Although Dasd has decreased in cost/byte, the average number of bytes of on-line storage per installation has increased. The cost of Dasd storage is therefore typically higher today and represents a significant target for effective cost management, he asserted.

DMF is similar to several other IBM 360- and 370-based products, but it differs by supporting such things as automatic migration and restoration of data sets based on various criteria, optional integration of migration data into existing OS catalogs and on-line access to the DMF migration data base.

Other capabilities built into the Idaps product are said to include full support for TSO "with no inherent TSO limitations," automatic backup of active data sets and cyclical use of magnetic tapes as off-line media.

DMF also supports dynamic allocation of files under MVS and integration of multisystem Dasd information into one data base, but still another of its strong points is the way it handles Dasd utilization reports, the spokesman continued.

The system reports space used and space available for use. It also shows space by DSGROUP and utilization of space within data sets as well as volume utilization, the spokesman said.

In addition, DMF provides an historical access profile for data sets and "comprehensive" data base reports, he added.

Installations accepted as test sites will be given a 30-day trial period after which they may acquire the package for $7,770/site, which Idaps said is 40% off the price it expects to charge once marketing begins.

Idaps is at Suite 700, 311 California St., San Francisco, Calif 94104.

OLS to Support Datapoint 1500s

PITTSBURGH, Pa. — Calling it a delivery system featuring intelligent terminals, application software and a File Transfer Program (FTP), On-Line Systems, Inc. (OLS) has introduced the Outline/1 service, which ties into the company's remote computing network.

The terminals offered by OLS under this plan are Datapoint Corp. 1500 series units, quite different from the "IBM 370/138 and 148 class" equipment offered by various other remote computing service vendors and different, too, from the IBM 5100-type unit announced by General Electric for its network users, OLS said.

Outline/1 is intended primarily as a data entry support system with initial editing handled at the terminal. "Clean" data is stored on diskette at the user site until it is transferred to OLS' Digital Equipment Corp. Decsystem-10 for processing, according to a spokesman.

The transfer — under control of the FTP — is made when the user calls for it and not under any sort of automatic polling triggered by the host computer. This approach should give a user the flexibility to collect what he considers all the data required and the ability to transfer data in burst mode, the spokesman said.

By supporting the Datapoint equipment — which it has labeled the OLS-1500 — OLS is also providing its clients with the use of Databus.

Outline/1 also includes interfaces to all OLS applications systems including, for example, the well-established Oliver data base management system, the recently introduced Omar market analysis and reporting system and Oscar for project management.

The OLS-1500 including FTP software can be purchased for $5,950 or leased for $295/mo (for 12 months) or $250/mo (for 24 months). Users who already have the appropriate Datapoint equipment can get the FTP for $25/mo/terminal.

OLS is headquartered at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

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Vtoc Contents Displayed

HERMITAGE, Tenn. — Users of IBM System/3 Model 15Ds who have previously depended on IBM's $Label utility to get printed reports on Volume Table of Contents (Vtoc) data can reportedly have more flexible displays of the data with less system overhead with the CRT-Vtoc program now available from BM Systems.

As the name suggests, CRT-Vtoc was designed to allow display of Vtoc data on an IBM 3270-2 terminal running under the Communications Control Program (CCP) or on the system console either in batch mode or running under CCP. $Label supported only printed listings on the data, according to BM Systems.

In order to clarify what space is available, CRT-Vtoc sorts together files and available space in location sequence. To enhance its performance, the package uses no disk work areas as does $Label, the independent vendor was quick to note.

Response time for displaying 16 files on a 3270-2 is as low as 1.5 sec, the spokesman claimed. Full Vtoc can be displayed or the user can specify a starting location. Displays may be limited to specific files or to available space, he added.

CRT-Vtoc is available under a perpetual license, with a 24-month warranty, paid up in 12 months at $20/mo. BM Systems is at 5980 Port Anadarko Trail, Hermitage, Tenn. 37076.

Codasyl-Like 'Seed' DBMS Ready to Run Under CMS

PHILADELPHIA — The Codasyl-type data base management system (DBMS) Seed has been adapted to two more environments. It has been running since November using IBM's Conversational Monitor System (CMS) under VM/370, and it has more recently been installed on a Modular Computer Systems, Inc. Classic minicomputer.

Previously, Seed had been implemented on machines ranging from Z80 microcomputers, Digital Equipment Corp. PDP-11s and Mod-comp IV minicomputers to Decsystem-10s and 20s, Control Data Corp. 6400s and Cyber 172s and IBM 370s, according to the vendor, International Data Base Systems, Inc. (IDBS).

The user-oriented features of CMS and Seed's DBlook language "combine very nicely to provide a powerful data manipulation tool," the spokesman asserted. With DBlook, users can modify and retrieve information from the Seed data base interactively, he added.

DBlook also provides on-line information on the structure of the data base and an interactive "Help" facility.

The implementation on Modcomp's Classic serves two purposes. First, it allows Seed users running on the Modcomp IV to upgrade their equipment without losing their applications programs. Secondly, it lets them move to Cobol if they wish, since that language is available on the Classic but not the Modcomp IV, the IDBS spokesman explained.

Seed under CMS costs $15,000, while the version for the Modcomp Classic costs $9,500. The basic Seed includes a Fortran interface; support for Cobol under Seed is optionally available for $5,000 (for CMS) or $2,750 (for the Classic).

Harvest, the query language/report writer adjunct to Seed, is expected to be ready for CMS shortly and to cost $10,000, the spokesman added from IDBS, Third Floor, 3700 Market St., Philadelphia, Pa. 19104.

Personnel Packages Written in Databus

ENGLEWOOD CLIFFS, N.J. — A pair of programs developed to help employment agencies keep track of their applicants and their client companies may have value as well for personnel departments handling internal staffing, according to the program's developers at Datamatics Management Services, Inc. (DMS).

Written in Databus for use on Datapoint Corp. equipment, the Search Employee Qualifications (SEQ) personnel system enables the user to interactively build, maintain and inquire against a data base of agency applicants (or, presumably, employees already working for a firm).

Equally interactive, the Professional Staff Skill Scheduling Technique program — with the rational but whimsical-sounding PSSST as an acronym — supports a data base containing information on job openings. This clearly could have use inside a company as well as in an employment agency, a DMS spokeswoman said.

The major weakness of SEQ, in terms of its use in a corporate skills-inventory operation, lies in the fact that its files are essentially "static" for each individual listed. They don't provide space for job or salary history; they simply show current status without any employee background.

This does not limit the employment agencies for which the software was designed, however. SEQ and PSSST work together to match applicants and job opportunities, the vendor claimed.

DMS can supply a turnkey system including a Datapoint CPU — apparently in the 1100 range — and the software for $16,000. SEQ and PSSST are available for use on existing Datapoint equipment for $950 each, the company said from 140 Rt. 9W, Englewood Cliffs, N.J. 07632.

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Data on Terminal Costs, Characteristics Listed

BOULDER, Colo. — A directory of computer terminals, just published by the Association of Time-Sharing Users (Atsu), is intended to provide users with detailed information about 120 terminals currently being marketed in the U.S.

Although there are a number of similar publications available, Atsu contended its book is more helpful to the user, whether he is just getting involved with time-sharing from a remote computing service or an in-house operation or is considering a change of equipment.

Atsu's *Computer Terminals Directory* disregards the vast number of terminals that are still in use but are not being actively marketed (and therefore supported) and instead devotes a page of standardized information to each of the more than 100 units currently on the market.

"Of course, a full description of all terminal features" is provided, along with a photograph of each device, a spokesman said. The latest pricing information is also given, he noted.

The lease cost of each terminal (when available), the number of terminals installed and the name of the person to contact at the vendor offices are also included. By republishing each entry at least once a year, Atsu expects to keep its information more current than that available from other directories.

In bound form, the directory is available for $45 prepaid. It is also by subscription, in loose-leaf form, as part of the three-volume directory the association provides its members for an annual fee of $85.

Atsu is headquartered at 75 Manhattan Drive, P.O. Box 9003, Boulder, Colo., 80301.

Report Writer Aids DG Users

TORRANCE, Calif. — A report generation package for Data General Corp. end users and software houses installing DG equipment has been released by Compusource Corp.

Compose II is written in Business Basic and operates under DG's RDOS. Reports can be custom-designed, formatted and produced by answering a set of questions displayed on a CRT terminal. No programming knowledge or previous computer experience is required, according to a spokesman.

Secondary files can be accessed to retrieve related data for inclusion, and an existing index permits definition of the selection and sort in order to speed processing, he added.

The package costs $3,000 for a single license and is available immediately. The price includes classroom training, a 90-day warranty and a 30-day guarantee. Compusource is at 21735 S. Western Ave., Torrance, Calif. 90501.

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'Flecs' Ready for RT-11

RESTON, Va. — A version of Flecs, a structured precompiler for Fortran originally developed at the University of Oregon, is now available from Berman Associates for use with small Digital Equipment Corp. PDP-11 minicomputers and the LSI-11 microcomputer running under RT-11.

Flecs provides users with control structures such as IF . . . THEN . . . ELSE, DO . . . WHILE and REPEAT . . . UNTIL, while still permitting the full flexibility of Fortran to be exploited a spokesman said.

The Flecs precompiler accepts user coding, including these structures, but outputs a conventional Fortran source file which provides the logic of the controls and is then processed by the RT-11 Fortran system provided by DEC.

The Berman Flecs/RT-11 package is said to include custom-written I/O routines that have been performance-optimized for RT-11. The software, along with a user's manual and installation guide, costs $105 on an 8-in. diskette.

Berman said a free version of Flecs is available from the DEC Users' Society (Decus), but claimed that an RT-11 installation could not use it without first coding I/O routines in assembler and copying the Decus program from the magnetic tape to diskette. By contrast, Flecs/RT-11 is "ready to go," Berman said from Suite 227, 11800 Sunrise Valley Drive, Reston, Va. 22091.

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'Vserv' Tracks DOS Disks

SANTA CLARA, Calif. — Vserv, the Volume Table of Contents (Vtoc) service utility from Software Assistance, provides a mapping facility for identifying wasted or poorly used disk space in IBM DOS and DOS/VS installations. Its Vtoc manipulation capabilities enable the user to take direct action in solving allocation problems and altering file attributes, a spokesman said.

The graphic disk map shows all data areas and free spaces in Extent order, followed by summaries and statistics for free space, alternate tracks and data set usage. It recognizes system files and libraries and displays end-of-file addresses, block and track efficiency and other information, he added.

The Vtoc manipulation commands supported by Vserv allow the user to create, delete, update or rename files or to truncate Isam or sequential files. The ability to recreate a destroyed Vtoc or to move an existing Vtoc to another location on the pack is also part of the package.

Vserv is distributed on magnetic tape for $500, with discounts for multiple-site installations. The vendor can be reached at P.O. Box 2101, Santa Clara, Calif. 95051.

Packages Keep System For Airfreight Flying

(Continued from Page 25)

formation. Kiac's output records would be included in the input to the Ramis Data base.

The Kiac output was made up of variable field lengths and contents, in variable length records. But that wasn't as much of a problem as the use of bit-level codes. Ramis isn't structured to work at that level, so something had to be done before the Kiac data could be added to the data base, Ellerbroek reasoned.

Interface Needed

Some sort of interface between Kiac and Ramis was needed. Because of the volume and the variability of the Kiac records, the "preprocessor" would have to be extremely fast, flexible and easy to expand as the need arose, Ellerbroek reasoned.

DYL-260 had already been used at Flying Tiger to build test data files for the developing systems, and it includes support for bit-level work. Ellerbroek and Director of Business Systems Ren Kalstrom recognized that it coold accept Kiac bit codes and expand them into equivalent fields that Ramis could support.

Because of the way programs are written with DYL-260, coding the preprocessor with it would take one-fifth the time needed to code it in Cobol ur PL/I.

In addition to fast programming, DYL-200 provides record counts and hash totals. This supplies Flying Tiger with an audit trail.

The Flying Tiger shop also uses The Librarian source (maintenance) program from Applied Data Research, Inc. Ellerbroek recently utilized the DYL-260/Librarian combination to help him through an especially hectic period.

"I personally produced 135 different reports for marketing in one week . . . without overtime," he recounted. In this instance, a DYL-260 source program was written, cataloged and then modified as required with source changes managed and monitored by The Librarian.

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Consider All Factors: Ross

Should You Hitch Your Wagon to IBM DBMS?

By Ron Ross
Special to CW

All of us know a mere ripple in the IBM pond can send tidal waves crashing across our DP shores. Somewhere in the dark recesses of our collective consciousness lingers the not-so-faint memory of the 360 trauma back in the 1960s.

IBM salespeople are no fools. In fact, they're a fairly professional lot, by and large. We've noticed, however, that they're sometimes asked to become data base experts on fairly short notice — a not so enviable task.

Written by a senior consultant at Performance Development Corp., a data base consulting firm, the accompanying article is a distillation of the experience and opinions of many of the company's staff members and clients. Comments can be addressed to Ross at Building P, 1101 State Road, Princeton, N.J. 08540.

Thrown in against the battle-proven pros from the independent vendors of data base management systems (DBMS), IBMers have to do some scrambling. What they must deal with, good and bad, is the following:

- The technical intricacies of IBM's Information Management System (IMS) DBMS can be exploited by the technically knowledgeable to solve a wide range of complex application requirements.
- In general, IMS is competitive with other DBMS, but by no means superior.
- Occasional doubts have been raised aboot the quality and reliability of IMS software.
- IBM is far and away the most difficult (and costly) to use of any DBMS on the market.
- The vast corporate weight of IBM stands behind the product (at least for now). Mainstream stability means motherhood to not just a few DP managers.

The resourceful IBM salesperson will rebuke the second, third and fourth points, mention the fifth in passing (no one is *that* naive) and then stress the first. To draw attention away from the lack of end-user facilities, he can outline the comprehensiveness of the system's data communications support; to make up ground lost by the rigidity of IMS structures, he can point to the considerable integrity IMS offers. By no means is there reason for the IMS salesperson to despair.

In some cases, however, IBM salespeople seem to have resorted to less direct measures. Whispering in the DP manager's ear, they caution against leaving the IBM mainstream.

Managers (as well as the rest of us) are left to ponder just what this might mean. An IMS black box or MVS/-IMS merger? Relational bridges? Microcoded DL/I? Nobody knows and IBM's not telling, at least not yet.

Somebody needs to yell "foul," or "restraint of trade" or whatever else the proper buzzword may be. In the first place, it's against IBM's own policy, apparently, to sell futures, and the salesperson caught doing so is asking for a lot of corporate grief. Just ask the salesperson to put the futures into writing and see what happens.

But perhaps, more importantly, the facts behind the mainstream argument are really not all that formidable. Close examination of the facts bears this out.

Three DBMS a Given

In our opinion, it is not unreasonable to argue that by 1983, IBM will be offering not one, not two, but *three* DBMS. Continuing IMS support, at least through the mid-1980s, is a given. Release of a relational system, with considerable fanfare, is not unlikely.

Finally, external pressures (specifically by the federal government) are likely to force IBM into releasing an ANS DBMS within three years. (Notice that's "ANS DBMS" — not "Codasyl" — although the difference is likely to be largely semantic.)

There are two basic ways to view these offerings: either your options for effective data management using IBM products *or* your problems in coordination and portability — which are really IBM's problem as well — are increased by a factor of three.

What about bridge software? IBM's past track record in continuing support for products falling by the wayside is not particularly good. Consider, for example, the following set of 360 and 370 products: MRP, DBomp, FTS, MTCS, IQF, Qtam, DOS, MVT and MFT. All have been essentially abandoned. Migration tools, when provided, often proved ineffectual. DOS-to-OS conversion support is a classic example.

That means the intelligent DBMS user should not count on IBM's providing an effective bridge between IMS and its future relational offering. The technologies they represent are as different as night and day.

(Continued on Page 30)

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To manage the center we have two problem-solving heavyweights, Kenneth Burgett and Thomas Rolander of Dharma Systems. These two helped write the book on computer system design. Burgett was project leader and chief implementor of Intel's ISIS* disk operating system and the RMX/80* real-time operating system. Rolander was applications manager for OEM computer systems at Intel.

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Kenneth Burgett (L) and Thomas Rolander (R) of Dharma Systems and Bob Mann, Western Micro Systems' general manager, evaluate a new piece of equipment in Western Micro's System Application Center.

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User Selection of Records Improved in 'Easytrieve'

OAK BROOK, Ill. — Besides offering more flexibility than its predecessors; Version 8 of Easytrieve, the information retrieval and data management package from Pansophic, Systems, Inc., gives users more control of record selection at output time, a vendor spokesman said.

Easytrieve utilizes free format English language statements to perform a range of retrieval and file management tasks. The system can select records, perform calculations, sort data and produce reports with control breaks and subtotals, all based on user-named criteria.

Intended for use under either IBM DOS or OS (or their VS counterparts), Easytrieve can be used to reduce job accounting data or to interface with several of the commercially available data base management systems.

Commands available in Version 8 simplify the definition of I/O files; allow users to deal with character strings greater than 256 characters long and data fields of variable length; allow immediate output of a print line or corresponding output file; and allow dynamic positioning of Easytrieve control within Isam or Vsam files, the spokesman said.

A multiple output feature has been expanded to allow any number of conditions to be used for each output report or file and to allow an unlimited number of output reports or files with one pass of an input file, he continued.

In addition, the company introduced Version 8's Unlimited Sequential Input/Output (USIO) selectable unit for installations wishing to expand their file handling capabilities. USIO supports GETs and PUTs for specified files and a JOB command that enables users to control multiple Easytrieve jobs running within one execution.

Prior to USIO, users were limited to working with a maximum of two input files at one time, and that was for match-merge operations.

Easytrieve costs $12,500 for the DOS (or DOS/VS) implementation and $15,000 for OS (or OS/VS). USIO can be provided for an additional $3,900 (DOS-DOS/VS) or $4,900 (OS-OS/VS), the spokesman said from 709 Enterprise Drive, Oak Brook, Ill. 60521.

Should User Hitch Wagon To IBM Data Base System?

(Continued from Page 29)

What about System R? We know it has been in beta testing at more than one site for some time. Because of nondisclosure agreements, however, performance details are sketchy. There is no way of knowing whether System R will be *the* IBM relational offering until it actually happens.

Informed observers believe that if and when the relational offering is made, IBM will encourage the idea that it is meant to co-exist with IMS, not replace it. There is a whole class of applications not presently being satisfied under IMS — those requiring high-level, user-oriented data retrieval — and this represents the ideal candidate application class (in theory) for a relational system.

One need look only as far as systems like Adabas from Software AG, and System 2000 from MRI Systems Corp. or, even better, at Magnum from Tymshare, Inc. and Nomad from National CSS, Inc. to see where IMS fails. But don't count on data being directly sharable between IMS and its relational counterpart.

Secondly, if the relational offering is in fact made, it is likely to be accompanied by some type of hardware support for pieces of IMS.

The Telling Point

Although many observers have always felt hardware support at the Vsam level would be much more likely (the performance advantages thus equally available to all DBMS), the facts of the matter would seem to be the following:

- IBM is unlikely to take any action that would automatically disenfranchise the users of other DBMS, since these users presently outnumber IMS users by 2:1. Even for IBM, still largely iron-oriented, this is no insignificant share of the market.
- Secondly, it would take a lot of hardware innovation to make IMS performance-competitive with other DBMS.
- Thirdly, plug-compatible hardware vendors and DBMS vendors are presently teaming up for performance innovations of their own. (Ironically, a hardware advance by IBM that caused a lock-out for independent DBMS users might actually push many of these users into the open arms of the plug-compatibles.)
- Finally, IMS-oriented hardware innovation is potentially harmful to IBM's future need to develop an ANS DBMS. Emphasis on hardware arguments, however, overlooks critical IMS shortcomings. No amount of hardware innovation can improve the quality of IMS documentation, ease the difficulty of data base system implementation under IMS or make IMS more end-user-oriented.

Taken together, these arguments collectively say hard-wired IMS does nothing to increase the productivity of people, a growing source of cost in everyone's DP budget. This, in our opinion, is the telling point.

In light of these speculations, Performance Development Corp.'s position on DBMS selection remains unchanged: Consider corporate data resource requirements, then choose the best software solution to fit them.

That solution is not always IMS, vague promises of mainstream bliss notwithstanding.

Should you wait and see? If you need systems today (or yesterday, as it usually happens), you've got no choice but to select from today's technology. In any case, although your commitment to data base may be large, remember that you're probably not hitching your corporate wagon to one DBMS forever.

Datapoint Executive Maintains:

DP Managers Cannot Ignore Voice

By Dan A. Hosage
Special to CW

It's little wonder that most DP and management information systems (MIS) managers have stayed away from trying to manage the voice communications area. Telecommunications has had all the necessary elements for a potential disaster.

But times have changed, and a couple of key occurrences should prompt innovative DP and MIS managers to take a new look at voice communications. One of these significant factors is the Carterfone decision of 1968, which first legitimized competition in the telecommunications area.

Before Carterfone, and actually until the mid-'70s, DP types avoided voice communications because there was very little they could do to solve the major problems which beset that area. Controlling costs, improving traffic engineering, employing alternative services to Bell — all of these worthwhile ideas couldn't be effectively implemented because there was no way of easily or efficiently gathering and massaging the relevant data to construct a really tight, cost-effective telecommunications system.

Then, in the mid-'70s, several companies began utilizing the minicomputer and/or microcomputer to perform these tasks. Suddenly there was a way to make rational decisions on trade-offs between cost and service, and a vehicle existed for allocating costs equitably throughout a corporation. At last a management tool existed that could help provide control over a cost-intensive area that had previously remained almost untouched.

But the existence of these tools really didn't serve to involve the DP manager in the voice area. Data processing needs and technology were growing at so rapid a rate that, by and large, the DP manager was more than willing to let the worlds of voice and data remain separate.

Integration Means Change

Now and for the last few years, however, a major change has been occurring. In every major trade publication and at every major DP or voice communications meeting, recurring references to "the integrated office of the future" are being made.

But while the integrated office has remained "in the future," most computer-oriented people have been content to minister to their specialized area rather than expanding their horizons to look at where this integration will take them.

For the DP manager, probably the first place this integration will occur is in the merger of voice and data. The merger makes logical sense, and at least one manufacturer has already effected it. This is no longer prophecy, it is reality.

Does this mean the DP or MIS manager needs to immediately assume all responsibility for the telecommunications area? Probably not. What it does mean is that because of their DP background, they will be the logical peuple to plan for and implement the integration of these functions.

To that end, DPers should familiarize themselves with the developments within the voice area that will allow for the integration and which have made the administration of telecommunications a much more reasonable task. They should start working with the voice communicatiuns manager, if no one is designated as the voice communi-

(Continued on Page 32)

Programmable Front End Slashes Response Time for Bank Tellers

N. HOLLYWOOD, Calif. — At Home Savings and Loan, the largest savings and loan company in America, as many as 170,000 transactions from 96 branch offices are handled daily by a central computer. To meet this high transaction throughput, it is essential that the time the computer takes to respond to input from an on-line terminal be cut to an absolute minimum.

Home Savings and Loan (HS&L) has cut the average transaction response time to any one of the 700 on-line terminals by more than 25% with a programmable communications front-end processor. Previously, the response time averaged 1.6 to 1.8 sec. It now averages 1.1 to 1.3 sec and is often less than 1 sec.

"With the large volume of transactions we process, saving split seconds is vital," according to Ron Reed, vice-president for technical support, on-line systems. "We now process transactions more quickly, and the total time per transaction is reduced. Customers appreciate the speed with which we can process their business."

At the heart of the improvement in response time is a Memorex Corp. 1380, which enables HS&L's computer to process as many as 1,000 transactions in less than two minutes at peak times.

Each HS&L office has between four and 24 CRT/printer terminal units on-line to the mainframe at the N. Hollywood data center. The terminals are located at the counter positions so that tellers can process customers' savings and loan business immediately.

The organization now has more than 1.1 million savings accounts and approximately 200,000 loan accounts. The data is stored on 10 disk drives with a capacity of 100M bytes each.

Escrow transactions are also on-line, as are hazard insurance-tracking functions, a word processing system and IBM's VM/370 conversational monitor system for interactive testing and debugging of new software. This represents approximately 65% of the data center's work.

The remaining computer time is devoted to DP work for the various insurance compa-

(Continued on Page 36)

Subsystem Handles Clusters Of Remote CRTs and Printers

MINNEAPOLIS — Control Data Corp. has introduced a multistation terminal subsystem that can handle up to 15 remote clustered CRT terminals and desktop printers.

The CDC 714 subsystem consists of single or master and slave terminals that can synchronously transmit data to the host computer at speeds up to 9,600 bit/sec. over either leased or dial-up communication lines. The master station coordinates the data transfer among the various CRTs and communications to the user's mainframe; resolves communications conflicts among devices; and supplies buffer storage for data being sent to the printers, according to a spokesman.

Printers and CRTs can be intermixed within the subsystem, and concurrent operation between CRTs and printers can be performed withuut adversely affecting overall communications, he said.

The CRT terminals incorporate data editing facilities for inserting and deleting characters, inverse video functions and a data protect capability that prevents operators from entering protected areas.

The subsystem is reportedly suited for order processing, short-term inventory and traffic control applications. It is compatible with the standard operating systems of CDC's 3000, 6000, Cyber 70 and 170 series

(Continued on Page 38)

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Timeplex Offers Short Leases

HACKENSACK, N.J. — Described by the vendor as an industry first, a short-term rental program for its Series I statistical multiplexers has been announced by Timeplex, Inc.

The rental program is designed to allow entry-level users and those undergoing system expansion to increase system efficiency while at the same time realizing a substantial cost savings, a spokesman stated.

Rental rates begin at $139/mo and include full factory service, the spokesman noted.

Timeplex is located at 100 Commerce Way, Hackensack, N.J. 07601.

DP Managers Urged to Speak to Voice

(Continued from Page 31)

cations manager, someone in the DP department should be made responsible for keeping up with developments in that area.

Major Breakthrough

But what are these developments in the voice area that have taken telecommunications out of the realm of black magic and into the area of being a manageable corporate function? As mentioned earlier, the application of the mini and/or micro to the telecommunications function was the major breakthrough in control.

These computerized telephone management systems perform several major functions that save money and provide necessary control. Their real-time ability ensures that all phone calls (long distance, in most cases) are prioritized, routed over the least costly line, queued for a few seconds or longer (if desired) to ensure a higher packing density of lower cost flat-rate lines and record data in terms of traffic and cost.

Of interest to the DP manager is that fact that this prioritization capability will allow immediate transmission of data over voice lines, eliminating the need to maintain separate and costly lines dedicated only to data transmission. The mini and/or micro performs these functions based upon the predetermined program and parameters that the user places in the system.

These systems have the ability to produce usable management information easily and efficiently for proper cost control and traffic or network engineering. They are generally easy to install and use.

No Installation Trauma

Unlike some so-called interconnect devices, these telecommunications management systems don't require any replacement of Bell's PBX or Centrex systems. They work in conjunction with Bell System (or any other accepted PBX) via voice connecting arrangements (VCA), thus avoiding the trauma of equipment replacement or wire or cable pulling. From the time of order, the system can be installed quite often in 60 to 90 days.

No user programming is required because all systems are sold on a turnkey or full service basis.

Currently there are three major producers of such systems — Plantronics/Action (Watsbox), Datapoint Corp. (Infoswitch) and TDX Systems, Inc. (Telemax). All of the systems are based on minicomputers, with the major differences between them apparent in the data manipulating and reporting functions.

Action's Watsbox has an IBM-compatible tape to process down-line on an in-house DP system or at a service bureau. This gives the user some flexibility on whether to furnish the reports in-house or delegate that responsibility.

TDX's Telemax provides reports or tapes from the central processing location. TDX essentially offers the entire system on a service-type basis and the user has the advantage of having little or no involvement in producing the reports.

The Datapoint Infoswitch provides a minicomputer, storage and printer on-site as well as packaged programs to massage all data. With this system, the user has the ability to produce cost allocation and traffic engineering reports on demand and under his control. There is also the option of obtaining tape from the Infoswitch system.

High Praise

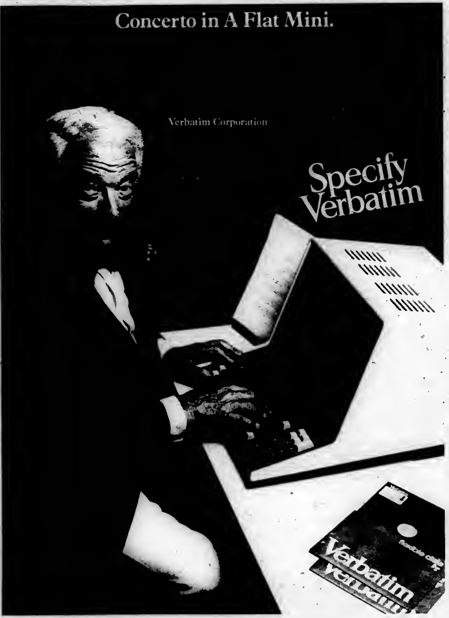
The really appealing thing about all of these systems is that they actually do work. Surveys by Harry Newton's Telecom Group consulting organization and a more recent study by Howard Anderson of the Yankee Group based on 400 to 500 users (the products are relatively new) show high praise for the leading systems.

In the cases of most of the current users, the systems have paid for themselves within a few months to two years. Purchase prices range from about $40,000 to well over $250,000, depending upon size and number of lines. In most cases, the systems can be leased as an alternative to purchase.

The systems pay out in a very short period of time because they bring savings of 15% to 45% in monthly long distance bills (ranging from $7,000 to over $100,000 per month).

It's time that the innovative DP manager took a good look at voice communications and its impact on his area of immediate interest — data processing. Whether he decides now is the time to begin to integrate these functions or whether he decides just to keep abreast of what's happening, he won't regret getting involved in the area of telecommunications.

Hosage is senior vice-president and general manager at Datapoint Corp. in San Antonio, Texas.



Service Station.

Shell Oil gets a lot of mileage out of TI's 820.

For almost a decade, TI's *Silent 700** and OMNI 800* data terminals have gone a long way towards meeting Shell Oil's communications needs.

When Shell needed a data terminal for their internal time-sharing network, the OMNI 800 Model 820 KSR impact data terminal gave them the high-speed capability they needed to serve thousands of users, in both remote and on-line locations.

Shell was also interested in updating their on-line invoicing system. The 820, with its high-speed transmission and quality impact printing, has been serving Shell's needs with clear, legible originals and multiple copies.

TI's 820 is also capable of going to work at Shell's refineries, well sites, even offshore rigs, to augment their production support system.

The versatile 820 KSR is serving in more than the oil field. Industries like banking, accounting and communications are calling on it for remote data applications and distributed networks.

Producing quality, innovative products like the 820 KSR impact terminal is what TI is dedicated to. And TI's over 200,000 data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

Supporting TI's data terminals is the technical expertise of our worldwide organization of factory-trained sales and service engineers. And TI-CARE†, our nationwide automated service dispatching and field service management information system.

That's why TI has been appointed the official computing company of the 1980 Olympic Winter Games.

If you would like more information on the Model 820 KSR impact terminal, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001, or phone (713) 937-2016.

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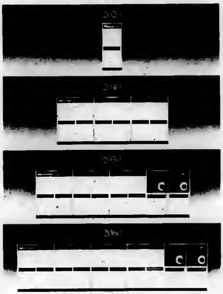

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In addition, DECSYSTEM-20 family software is fully proven, with over 15 years of development behind it. The TOPS-20 virtual memory operating system supports a full complement of industry-standard high level languages, including the lowest cost full-mainframe, APL on the market. And with their comprehensive system utilities and specially designed interactive architecture, all DECSYSTEM-20's are surprisingly easy to use for both skilled and unskilled operators.

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Programmable Front End Saves Bank Teller Time

(Continued from Page 31)

nies owned by H.F. Ahmanson Corp., HS&L's parent company.

On-line processing has been used here for more than 10 years. Since 1971, a Memorex 1270 terminal controller, attached to an IBM 370/158 mainframe, has controlled the remote terminals.

"During its seven years, the 1270 was extremely reliable," Reed said. "Its meantime between failure was excellent, as were its response times. As a result, when it came to replacing it with a programmable terminal communications processor to give us more flexibility, we naturally looked at what Memorex had to offer."

In all, six manufacturers were carefully evaluated before the 1380 was selected. A configuration of hardware and more software flexibility that enables the company to modify and amend communications processing routines easily was the key factor in the decision to acquire the processor, Reed said.

The 1380 is, in essence, a computer serving as a communications bridge between a mainframe and its terminal network. It has a base MOS memory of 64K bytes. A flexible disk provides 2.5M bytes of storage that can be used to store application programs and diagnostic software normally resident in the host.

The 1380's applications software has been enhanced by HS&L's programming staff to suit its special needs. Reed reported that it has been easy to work with the software tools provided, such as the assembler and linkage-editor. In addition, Memorex systems engineers, working from the Los Angeles office, have provided good field support, he said.

Software Enhancements

The enhancement behind the improved terminal response times consist of minor enhancements to IBM's VM/370 operating system and a series of halt I/O commands written into the 1380 and the FTS on-line system resident in the host. The enhancement allows the autopolling sequence to be halted without suppressing data already on the line when the 1380 is randomly addressing terminals.

"Normally, when the CPU has a message to send, it has to wait until the autopolling sequence is finished," Reed stated. "If it issues a halt I/O command during polling, all data on the line is suppressed and has to be retransmitted. Either procedure involves time-consuming delays. With our enhancement, the 1380 retains the data on the line and allows the CPU immediate access to the terminal it wishes to address."

Halting the autopolling sequence immediately saves an average of .5 sec in addressing a particular line. In total, HS&L has a network of 15 lines operating at 1,800 bit/sec, with up to 15 branches each per line. All the lines are leased from the telephone company and are dedicated to the on-line system.

Future Plans

Future development will occur in the applications software area. HS&L has installed a second 1380 for program development use.

The second 1380 will act as a backup unit in the event of a failure in the first 1380; Reed reported an uptime on the first unit as high as 99.9%.

The plan is to off-load a large part of the front end of the on-line system from the host to the 1380.

"This will mean that the CPU will be able to issue a simple communications command to the 1380, which has been programmed to carry out the full sequence of perhaps 20 commands necessary to perform the given task," Reed explained. "At present, the full chain of commands is held by the host and takes up valuable on-line processing time. We estimate that this off-loading will give us a 10% reduction in on-line time per transaction."

At the same time, CPU programming will be simplified. Instead of a sequence of commands transferring data to a terminal, a single command from the CPU to the 1380 will be all that will be required.

May Symposium Slated to Discuss Local Networks

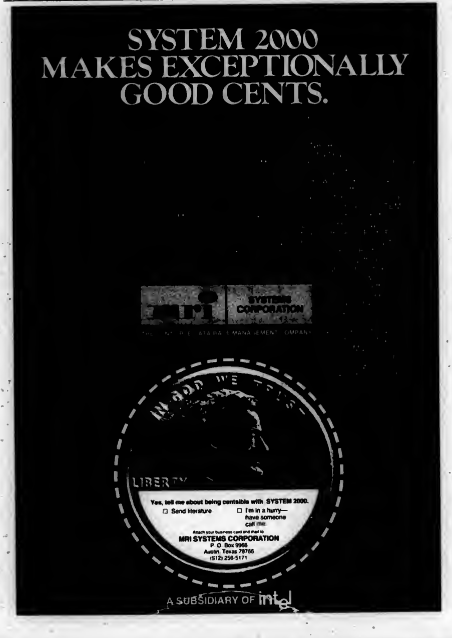
BEDFORD, Mass. — A three-day symposium on local area communications networks and applications will be sponsored by the National Bureau of Standards and Mitre Corp. on May 7-9 in Boston.

Designed to bring together users and system developers from the government, industrial and academic communities, the meeting's workshops and sessions will center on specific applications and technical problems in such areas as communications protocols, standards, simulation, modeling, network control and interconnections, a spokesman stated.

Limited Attendance

Attendance for the gathering is limited to 300 people. The registration fee is set at $175; this covers admission to all sessions and workshops, dinner the first day, three luncheons and a copy of the proceedings, the spokesman explained.

Further information is available from Karla Edwards at Mitre Corp., Mail Stop A190, Bedford, Mass. 01730.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Colors Associated With Words

Color Graphics Helps Deaf Kids Learn to Read

LOS ANGELES — The basics of reading, writing and other language skills are being taught to deaf preschool- and kindergarten-age children with the aid of color graphics at Cienega School in the West Covina Valley Unified School District near here.

Called Computer-Assisted Instruction in Language and Reading for the Deaf, the program uses color-coding to provide an orderly instruction sequence for teaching deaf children basic language skills. Children are taught to associate color with words and manual signs by means of a color graphics terminal linked to a minicomputer.

The experimental program was developed by Dr. Gary C. Galbraith, a professor of psychiatry at the University of California at Los Angeles (UCLA), and Dr. Robert Lennan, superintendent of the California School for the Deaf in Riverside, Calif. The program was adapted to computer format from a textbook for the deaf.

"A high-quality raster scan color terminal was essential to the successful implementation of this program," according to Galbraith. "We had to have color capabilities in the terminal — it wasn't just a fringe benefit or a frill."

Colors, Signs Coordinated

The curriculum was adapted to computer format from *Building Blocks for Developing Basic Language*, a basic text for educating deaf children. Students are shown a particular color and the hand sign for that color. This is followed by the word for the color (e.g., "blue") and the hand sign. The color capabilities of the CRT are used to prompt students in forming simple sentences.

In addition, color allows exciting graphic displays that Galbraith says should "increase motivation in the learning task" for students. Another advantage is "the ability of the terminal to present high-resolution, two-dimensional illustrations of manual communication signs and finger spelling hand positions," he noted.

The pictures of objects and the two-dimensional drawings of hand signs and finger spelling are entered into the system via a digitizing tablet. The limitations on this method of teaching are a function "of manpower only and not of the hardware," according to Barbara Peterson, a researcher at UCLA who hopes to expand the program dramatically in the near future.

"We hope this experiment will enable us to extend our teaching downward in intellectual ability to reach mildly and moderately retarded children," Galbraith added.

The instructional program uses a branching-type educational sequence; that is, a child progresses through simple teaching sequences in order, as long as he doesn't make any errors. If the student makes an error, the system directs him to remedial instruction.

Successful performance on regularly interspersed tests only allows the child to return to the normal teaching sequence. This method is used to minimize the amount of time students must spend with material that is below their level of achievement, according to Peterson.

The Ramtek Corp. 6200A Colorgraphics terminal used in the program was chosen after extensive research. "We were looking for a color graphics system with excellent color rendition and visual clarity that was easily operated and programmable and had an affordable price," Galbraith said.

The program is being funded by an $65,000, one-year federal grant from the Handicapped Media Services and Captioned Films Division of the Bureau of Education for the Handicapped, part of the U.S. Department of Health, Education and Welfare.

Users of POS Made by NCR Organize Group

WESTBURY, N.Y. — Users of NCR Corp. point-of-sale (POS) terminals have been invited to join a recently formed users group dedicated to providing a forum for the exchange of design ideas and development experiences.

Established on Jan. 31, the NCR POS Users Group currently represents users in the New York and New England areas. However, membership will be extended to all NCR terminal users who would like to share their particular needs or dissatisfaction with POS installation support and software development efforts or who can advise other members of used POS equipment purchase or sale possibilities, a spokesman said. The group is not affiliated with NCR, he emphasized.

The group is planning to hold four meetings per year. The first one is scheduled for the New York metropolitan area on April 4.

Membership applications and copies of the organization guidelines can be obtained from Barry Siegal, membership chairman, at P.O. Box 40, Westbury, N.Y. 11590. Group information can also be received from David Huisjen, the association's president, at 20 Glover Ave., Norwalk, Conn. 06852.

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Los Angeles (213/473-0811)		4-6				
New York (212/541-7780)	12-14		21-23			
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Intelligent Terminal Handles Four Floppies

TEMPE, Ariz. — An intelligent terminal system introduced by Consolidated Computer International, Inc. reportedly features 64K bytes of user memory, a 1,920-char. CRT and the capability to handle up to four floppy disk drives.

The Key-Edit 22 terminal system — the basic model of the firm's Series 2 line — incorporates a dual floppy disk drive with 486K bytes of storage. It can be used for data entry, billing, order entry, message transmission, date collection and other networking applications, according to a spokesman.

System options include a 340 char./sec printer, communications controller and additional floppy disk drives which boost the storage capacity to 972K bytes.

Key-Edit software includes a high-level user programming language and a data entry utility designed for specification of error-checking requirements.

An internal microcomputer-controlled diagnostic system provides a communications link with the vendor's central resource centers to facilitate support and service.

Prices for the Series 2 systems begin at approximately $14,000 for the Key-Edit 22, which can be leased for $350/mo. Consolidated Computer International is located at 1604 S. Edwards Dr., Tempe, Ariz., 85281.

Runs at 60 Char./Sec.

Harris 8000 Gets Matrix Printer

DALLAS — A unidirectional matrix printer introduced by Harris Corp.'s Data Communications Division as part of its 8000 series line features an automatic on/off motor control and a print-speed of 60 char./sec.

The Model 3155 was designed for small clusters of CRTs where the actual print time and number of CRTs accessing the printer is relatively low, a spokesman stated.

The unit's print mechanism operates at 10 char./in. in line lengths of 132 characters. The printer can be located up to 2,000 feet away from the controller.

Nonstandard Paper

Forms can be fed into the machine from either the rear or the bottom; the printer can accommodate multipart or nonstandard paper. The unit's tractor-feed mechanism can be adjusted to handle paper widths up to 17.3 in., the spokesman noted.

Print characters are available in Ebcdic for Harris 8170/8180 systems and in Ascii for the Firm's 8160, 8210, 8220 and 8770 machines.

The Model 3155 sells for $3,380 and can be leased on a two-year plan for $135/mo, maintenance included, the spokesman said from 16001 Dallas Pkwy., P.O. Box 400010, Dallas, Texas, 75240.

Nonimpact Thermal Printer Developed for OEM Firms

BURLINGTON, Mass. — A microprocessor-controlled nonimpact OEM thermal printer, the Model Q3, designed for applications demanding quietness, compactness and ruggedness is available from Computer Devices, Inc.

Typical systems applications include DP output, test data logging, on-line/off-line printing, medical instruments and systems reporting, CRT hard-copy output, received-only printers and data terminals, the vendor said.

The Model Q3 is an 80-column, 50 char./sec. thermal printer with a 5 by 7 dot matrix printing capability; it generates the full Ascii set of 96 upper/lower case characters and has the availability of dual character sets.

Other features include an electronic solid-state print head mounted on ball-bearing carriage, electronically controlled stepper motor drive, patented print head control, a weight of 4.5 pounds, adjustable print density with automatic compensation when hot/cold or slow/fast and fully interchangeable parts.

Available Options

The complete range of options and accessories include character generators for 96- or 188-char. sets, APL and foreign fonts and codes, top-of-form detection and operation, binary mode for printing all control codes using Federal Information Processing Standard No. 36 characters, serial interface and limited graphics.

In OEM quantities, the Model Q3 thermal printer is priced at $676. Computer Devices is at 25 North Ave., Burlington, Mass. 01803.

Handheld Unit Has Display Of Up to 960 Characters

NASHUA, N.H. — An RS-232C-compatible industrial control/display unit unveiled by the Terminflex Corp. features full or half-duplex communications capabilities and a display buffer that can handle up to 960 characters, according to its vendor.

The Termiflex HT/7 incorporates a two-line display of 20 (.15-in. high) char./line and a switch-selectable scrolling function, a spokesman said.

The unit also has a line adjust formatting mode to ensure that messages begin at the left of each line and that words ending a line are not split. An edit mode permits alteration of a single displayed line.

Adjustable Speed

The handheld control/display unit features adjustable speed and parity and a simple keyboard that transmits and displays all 128 Ascii characters and codes, the spokesman continued. The HT/7 operates on +5Vdc and internally develops the 12Vdc needed by the RS-232C interface.

The unit is priced at $2,595 from the company at 17 Airport Road, Nashua, N.H. 03060.

CDC Adds Subsystem

(Continued from Page 31)

computer systems.

Users can purchase an entire subsystem or begin with a single terminal station which can later be converted to a master station terminal. Additional slave terminals and non-impact and multicopy impact printers can be linked to the converted station according to the user's needs.

The CDC 714-30 master station terminal is priced at $10,108 and can be leased for one year for $259/mo. The purchase and lease prices for the 714-20 single-station terminal are $5,361 and $165/mo; the 714-25 slave station terminal costs $4,490 and $112/mo.

The monthly maintenance fee for the master station is $70, while the single station's fee is $47/mo and the slave station's fee is $45/mo.

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By Howard A. Karten
CW Staff

MADISON, Wis. — Have you covered your assets? The history of DP reveals that many companies haven't, according to the "Emergency Planning Guide for DP Centers" recently published by *Assets Protection Journal.*

The booklet contains a 63-page checklist to guide DP managers in setting up a protection plan.

The first step in preparing for possible disaster is to set up an Emergency Planning Group that will develop, implement and enforce security and emergency policies and procedures for a DP shop, the guide noted. The group should meet regularly to monitor the company's emergency plan and keep it up to date, re-evaluate any threats or dangers to which the company may be exposed and review and test new emergency policies.

Once the planning group has been established, it should begin to analyze "threats and vulnerabilities," the report stated. The data center's susceptibility to accidents, "acts of God," arson, blackouts and brownouts, boiler explosions, bombs and bomb threats, chemical accidents, civil disorders and cold weather should be analyzed.

Seventy-six other potential trouble sources — many of them currently in the news — are listed, including falling objects, disgruntled employees, high-crime areas, nuclear attacks and tornadoes.

Breadth of Coverage

After determining whether any of the hazards pose a threat, the planning team should determine the breadth of the company's insurance coverage. For example, the report asks, "Does your company's insurance policy cover damage or destruction" to the computer, related peripherals, office machines and forms-handling equipment such as decollators and bursters regardless of whether they are owned, leased or rented?

However, damage to hardware is only one concern — and potentially a relatively minor one — in

(Continued on Page 44)

User Slides Into Time-Sharing

By Connie Winkler
CW Staff

PARAMUS, N.J. — Witco Chemical Corp. is beginning that long journey from using an IBM 360/50 to supplying time-sharing capabilities to its 15 divisions with an IBM 3031 that provides Virtual Storage Personal Computing (VSPC) facilities.

It's a slippery task for the specialty oil and industrial chemical firm with operations all over the country because the company is growing rapidly from within — and by acquisitions. Last year, Witco revenues were $751 million, and it acquired Southwest Grease Co., which had a 15-person DP operation of its own.

Witco is now wholeheartedly embracing the time-sharing solution and spending $150,000 monthly on it in the hope of making DP more responsive to the operational needs of the company.

"There's a general recognition by the management that computer services can make a contribution to the bottom line of the organization," according to Warren Davis, director of management information services (MIS) at Witco. "DP is beginning to address operational as well as financial needs."

There was a demand for computer resources from end users in the corporation and, with the brute power of the 3031, it was felt the way to provide these resources was through time-sharing, Davis said. The evolution of DP at Witco is almost a casebook study of the development of DP shops.

"Corporate MIS wasn't able to service operational needs. Each division had a mini to solve operational problems," Joseph C. Titelius, manager of computer operations at the corporate data center, recalled.

"But," Titelius said, "a lot of our

(Continued on Page 46)

Three Shorthanded Schools Now Share One Mainframe

By a CW Staff Writer

SAN BERNARDINO, Calif. — Some users have difficulty finding the right-size system at the right price, despite the constantly dropping prices and ever-improving performance of computers.

Two colleges and a public school district solved that problem, however, by pooling their resources. The result is a large system owned and used by the two colleges and on which computer time is sold to the public school district. The arrangement gives all three parties access to a mainframe that suits their needs without breaking their budgets.

The San Bernardino Community College District, composed of San Bernardino Valley College and Crafton Hills College, owns the system, a Burroughs Corp. B6807. The nearby Rialto Unified School District uses a Burroughs B1700 as a remote job entry (RJE) terminal to communicate with the 1.5M-byte mainframe.

A Burroughs B700, located adjacent to the mainframe, is also used as a terminal by the college district. These terminals are supplemented by 27 dedicated terminals in other locations.

The system runs under Burroughs' Master Control Program (MCP) operating system, using Data Base Management System II (DMS II), Network Definition Language (NDL) and the Command-and-Edit (Cande) language. All the programs on the system are written in Cobol, which makes the system easier to run and more adaptable, according to Robert D. Kirk, director of the district computer center.

Before buying the Burroughs system, the college used a Burroughs B2700. The upgrade to the larger Burroughs system was

(Continued on Page 44)

Adieu

Dartmouth College systems analyst Philip Koch bids a fond farewell to one of the Honeywell, Inc. 66/40A processors recently replaced by a Honeywell DPS-3. See story on Page 45.

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Lingerie Manufacturer Finds

On-Line Systems Round Out Production Barbs

VAN NUYS, Calif. — Managing the information needed to run a $40 million business is difficult, but especially so when the business has been growing at a rate of 15% a year and its critical data is highly volatile.

Just such growth and informational demands led the Olga Co. here to upgrade its DP systems twice in the last decade. Even though the company now runs its 512K-byte IBM 370/138 for 18 shifts a week, it is planning to add on-line functions.

The company, which began as a small family operation in 1941, has used computers to support its order processing, manufacturing and accounting operations since the late 1960s. In the past 10 years, however, the lingerie manufacturer has experienced an annual growth rate of about 15%. It became clear to management that its original 360/30 would have to be replaced by a 370/125, then upgraded to the 370/138 with extensive on-line systems.

The company's use of DP has already improved material planning efficiency and raw material warehouse operations. Because of the DP changes, the need for additional personnel is expected to lessen despite company growth. The company expects to see a savings through a reduction of its raw material inventory, company officials added.

"In recent years, the basic undergarment has become more and more subject to consumer fashion consciousness. This means our forecasters and production planners need timely access to accurate data to react quickly to constant changes in the marketplace. That's why our primary thrust in development of DP systems has been directed to our front-end manufacturing systems," according to Steven Gerber, manager of the firm's information services.

On-Line Conversion Plan

The company has embarked on a three-year plan to convert most of its batch-oriented DP systems to run on-line. As part of this effort, the firm has equipped its mainframe with six 3340 and two 3344 disk drives, 34 remote IBM 3277 CRTs and seven IBM 3287 printers.

Terminals — located in the DP, production/material control, warehouse and engineering departments — have been enthusiastically accepted, Gerber said.

One of the first on-line applications to be implemented was the raw material inventory control system. Development of this system was a high-priority project for the company's DP staff because the only records on these materials had been maintained in a manual system. Under the automated system, the company's raw material inventory — mostly rolls of fabric — is maintained and updated on-line.

Material received in the warehouse is logged into the system through a CRT. The system then generates an internal receiving document, plus a sequentially numbered identification tag for each roll of material. These are printed in the warehouse on one of the remote printers.

"Previously, this job required four people to work full-time in the receiving department. With the system, fewer people are needed and more accurate, more legible documents are processed," Gerber said.

Any of the terminals can be used for on-line inquiry into the company's inventory, and the availability and location of every item in that inventory can be instantly determined, a spokesman said.

"Previously, with all the manual paperwork involved, there was an unsatisfactory time lag before current inventory data was available in the system," Gerber explained. "Now our production-control people know what raw materials we have in the warehouse almost as soon as it comes across the loading dock, and that is extremely important in a dynamic manufacturing environment, such as ours."

Final Phase

When the system's final phase is completed, IBM 3277 CRTs will be used to carry out the raw material requisitioning and "returned goods" functions. As the production control department produces its cutting orders, the requisitions for raw materials will be entered through a CRT.

These requisitions will be printed in the material control department or transmitted to the warehouse to be printed on the hard-copy printer. Warehouse personnel will be able to use the system either to confirm the issue or to inform production control of any missing items.

Another application on the system, bill of materials, replaces a manual operation. "With our range of styles and colors, and with up to 25 different components per garment, this operation was very complex," Gerber pointed out. "It required several people who checked the production schedule against a printed bill of materials and manually calculated piece part requirements for each garment to be manufactured.

"The bill of materials is now maintained on-line, and any schedule changes are entered into the system and run against the disk-stored bill of materials," Gerber explained. "This has resulted in a major savings in our labor effort and has cut the planning cycle in manufacturing by at least two weeks."

Forecasts Put On-Line

The latest project by the company's management information systems staff has been the development of a system for on-line recording and updating of sales forecasts and manufacturing schedules. Manual operations ate up many hours. Hand calculations were needed to translate forecast figures into production figures, Gerber noted.

"The process, along with adjustments to the schedule, usually took at least two weeks to complete; if a forecast changed in mid-month, that section of the schedule had to be recalculated," he recalled.

With the latest system, the forecast can be changed on-line, and the system can automatically recalculate figures as needed. This means production control and other processing personnel will be able to react more rapidly to changes, Gerber said.

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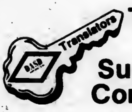

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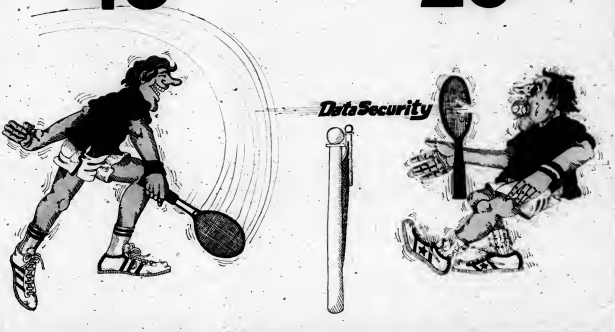

In the last 6 months the Cambridge Systems Group has sold more than twice as many data security systems (ACF2) as it's competitor (IBM's RACF) has in the last 3 years!

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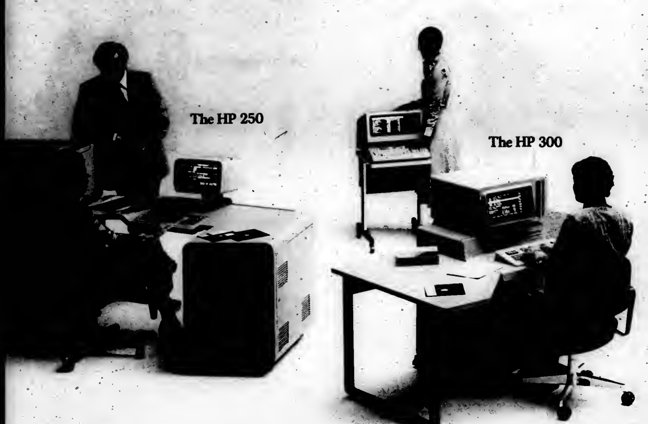

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In fact, it gives you all the advantages of a fast, sophisticated computer—including data base management—without having to hire an expert to run it. And it's priced from just $24,500.

The HP 300 uses advanced Hewlett-Packard technology to pack enough power into its slim console to support 16 terminals. Its innovative display simplifies operating the system, with eight keys adjacent to the screen that can be programmed to lead you through every task.

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The HP 3000 Series 33

The HP 3000 Series III

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Two Colleges, School District Share Mainframe

(Continued from Page 39)

not planned as a migration within a single vendor's offerings.

"We developed our specifications and sent requests for proposals to eight vendors. Burroughs was the only one that responded and we liked its proposal, so we accepted it," Kirk explained.

Conversion Requirement

An important part of the proposal was the requirement that the winning bidder convert the existing programs on the B2700 to the new system. Many of the vendors who didn't respond cited this requirement as a bar to a proposal, Kirk noted.

Equally important was the thorough, detailed benchmark called for in the college's specifications. "The benchmark measured not only what we were doing, but also what we planned to do, and [the B6807] performed very well.

"The benchmark was a combination of batch running local on a B6807 and remote batch to simulate the link with Rialto," Kirk said. "In addition, we wanted the Burroughs' people to bring up our existing data base and run a transaction on-line simulator to measure the on-line response time.

"We required that they pump 20,000 additions, changes and deletions to the data base, and we measured the response time on that. We had five terminals on-line that were used to further measure response time," Kirk added.

A key aspect of the specifications the school district submitted to vendors was the acceptance test period. That requirement called for 30 consecutive days of 95% uptime, he recalled.

"If at any point the cumulative percentage of downtime had risen to 5.01% or above, the acceptance would have slipped that much further," until the hardware had run at 95% up-time for 30 consecutive days. "But there was no problem with that — the hardware completed acceptance testing 30 days after it began."

Since the system was installed, it has performed well for the college. "It had infant mortality, like all systems, and it is a workhorse," Kirk noted.

After it was installed and the programs were converted in July, it ran well until October, when "we had a lot of problems." Since then, it has settled down and only peripherals occasionally cause trouble, he said.

One of the areas Kirk stressed in discussing the system was the on-site engineer. "The fellow who maintains the system works for us, full-time, every day. He covers this site as well as the B1700 and the RJE location."

The system runs approximately 14 hours a day, five days a week. Most of the system's workload is what Kirk termed "typical school stuff — budgeting and finance, personnel, class schedules, college catalogs, student records, financial aid" and supporting functions.

Not much research is run on the systems, but the college does have an "open lab — instruction in business DP and computer use go on all the time," Kirk stated.

Kirk doesn't need a systems programmer to help run the installation. A former IBM systems programmer himself, he said of systems programming, "It's a miserable job. The [Burroughs] system is so much easier to use; we do all of our programming on-line.

"We don't tailor or modify the software at all. Our theory is 'Kiss — Keep it simple, stupid.' " This approach doesn't result in any loss of flexibility or performance, he insisted.

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Guide Advises Coverage

(Continued from Page 39)

determining the extent of insurance coverage. The planning team should determine insurance coverage for all DP media such as disks, tapes, paper tapes and drums as well as additional expenses that may be incurred as a result of a disaster.

These include rental of temporary office space, facilities and equipment, utilities, temporary construction and similar items, the report noted.

In addition, planners should investigate coverage for interruption of business activities — some of which have some exclusions — and insurance protection for the loss of receivables resulting from destruction of records. Dr. Carl Hammer of Univac has cited the case of a firm whose tape of accounts receivable was stolen by a disgruntled employee. The company went out of business shortly after the theft.

In checking over the physical and business aspects of disaster preparation, team members should not overlook the human factor. Among the considerations in preparing for and recovering from a disaster are bonding and periodic rechecking of critical personnel, supplying employees with ID cards including picture and signature and providing special authorization in the event of geographic or curfew restrictions, the report stated.

Doing Corporate Paperwork

Furthermore, the company should have its corporate paperwork done in preparation for an emergency. Telephone numbers for security and fire personnel, as well as critical personnel, should be listed in priority sequence.

In preparing the list of phone numbers, users, customers, vendors and other key personnel should be included, the report continued.

A question to be considered is whether management personnel can run the data center operation if others are unavailable. This means personnel should be cross-trained in each other's duties and in the use of each other's equipment, the report asserted.

A possible source of help during an emergency could be former or retired employees, the report suggested.

"Do you microfilm records as an additional means of providing backup?" the report asked, suggesting one precaution a company might take.

After the proper arrangements have been made and the disaster plan is viewed as complete, companies should conduct "test" disasters. "Too many times, companies have developed and implemented emergency plans that were not tested. Unfortunately, 'live tests' resulting from actual emergency situations have proven to be costly [because of] inadequate and improper planning," the report pointed out.

The "Emergency Planning Guide for DP Centers" is available for $10 from Assets Protection at P.O. Box 5327, Madison, Wis. 53705.

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Dartmouth Makes Room For Honeywell 66/DPS, The First to Be Released

By Michael Vitale

Special to CW

HANOVER, N.H. — Dartmouth College recently completed installation of the first commercially released Level 66/DPS from Honeywell, Inc. The 384K-word system, with paging and segmentation hardware, replaces a dual-processor 66/40A that had been installed in 1976.

"We expect the new system to support at least 350 simultaneous users," William Y. Arms, director of the Kiewit Computation Center, said. "The college should not have to buy another mainframe for at least five years, despite the fact that system usage continues to grow at a steady 10% per year."

The latest equipment consists of two Honeywell Level 66 processors that support the Dartmouth Time-Sharing system (DTSS). The system first ran in 1964 on a General Electric GE-235/-Datanet 30 combination that was later upgraded to a GE-635. That system lasted for 10 years before it was replaced by the 66/40A.

Besides the two processors, the system includes several tape and disk drives and 2K words of cache memory in each processor. The overall speed improvement over the 66/40A is approximately 100%, college officials estimated.

Installation in Stages

The computation center staff and Honeywell field engineers scheduled the installation to occur in stages.

Over the first weekend, additional memory was installed and tested on the 66/40A system. During the next week, the time-sharing system ran on a single 66/40A processor while the first Level 66/DPS CPU was installed. This processor was used to provide computing the following week while the second Level 66/DPS unit was connected.

"There were some problems during installation," according to Arms, "and our reliability dropped from its usually 99% of scheduled up-time to about 97% , but the only major delay was unrelated to the upgrade." The delay resulted from disk problems.

Another interruption in service occurred about a week after the upgrade, when a problem somewhere in the college heating system filled the Kiewit machine room with hot steam. Quick action limited the damage to a single board. The component was replaced and the system was back up within an hour of the incident.

Arms' plans for new equipment, which serves other schools in the Northeast in addition to Dartmouth, include a coaxial cable network that will bring high-speed, low-cost communications to the entire campus; a new editor that will be easy to use and that will support more intelligent terminals; and a redesign of the DTSS executive to make full use of the virtual hardware features of the Level 66/DPS.

Dartmouth is also working on a new version of Basic, the language invented by Thomas E. Kurtz and John G. Kemeny, who is now the college's president. Provisionally named Basic 7, the new verion will include both structured programming constructs and graphical output statements.

"The one area I'm not really sure about is data base management," Arms continued. "But DTSS, Inc., which licenses DTSS software commercially, is working on a new data base manager, and the college might use that."

Dartmouth College is the first DTSS installation to use DPS-level equipment.

Vitale is director of marketing for DTSS, Inc.

Wanted: Data Entry Recipes

For all its sophistication and processing speed, a computer is very much like an apple pie. If nothing is put into its electronic crust, it won't appeal to anyone's taste or serve any real purpose.

Putting data into a multi-million-dollar machine or compact minicomputer is the only way to get usable data out — and the only way to make what would be just so much scrap metal and wiring into a functional piece of machinery.

Computerworld will explore the ins and outs of data entry and various methods employed by manufacturers and other business users in a special report in April. If you have an interesting story to tell about your particular system or data entry methods — or would just like to expound on the topic of data entry itself — we would like to hear from you.

Simply send four or five typewritten pages detailing your data entry escapades to Tim Scannell, *Computerworld*, 797 Washington St. Newton, Mass. 02160 before March 26. All contributions will be acknowledged.

And who knows: the data entry solution you tell us about in your story could be just the exit another user needs to solve a problem.

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Lonely User Gets Supplies, Arms Itself With Memory

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Comshare, Inc. found an answer to that question which carried with it savings in space and energy.

With operations in North America, Europe and Japan, Comshare had built its business around Sigma 9 systems. Then Xerox Corp., which manufactured the systems, withdrew from the computer business.

Xerox's decision came at a time when Comshare was considering an expansion of its computer center here to handle the firm's growing volume of business.

"We found ourselves being a user with no sopplier," according to Jesse Caravello, vice-president of operations. "So we decided to become an independent in the areas of memory and peripherals, while securing mainframes from the user market.

"We looked around for a company that we felt was a dependable supplier, that could work with us to design an interface and that could put a foreign memory into a Xerox system to give us expanded capability and increased reliability," he added.

Ampex Corp.'s Memory Products Division met all the criteria, Caravello said.

Out of that association came the Ampex ARM-9 plug-compatible mainframe memory for Sigma 8 and 9 computers. Each ARM-9 provides 128K to 256K (four-byte) words of capacity, including an eight-port interface and two- or four-way interleaving.

Missing Element

The one element missing was an interface to the Sigma 9. "Our engineering group worked with Ampex to lay out the specs, and Ampex built the interface," Caravello noted.

Comshare later decided to double the size of memory on each system and to double the number of processors in the memory from one to two. "So we ended up with very large, high-powered systems using Ampex memories," Caravello said.

Before Ampex entered the picture, Comshare had operated with four Sigma 9 dual processors. The company now operates with seven dual Sigma 9s and 15 ARM-9 memories, increasing its processing capacity by about 100%.

But because an ARM-9 cabinet with a 256K-word capacity requires only 8 sq ft of floor space — 10% of the space needed for equivalent Sigma memory — Comshare has been able to place more capability into less space at its computer centers. No physical expansion has been necessary.

User Opts for Time-Sharing

(Continued from Page 39)

plants have inventory, production and engineering problems that also needed to be solved." There are about a dozen DP sites around the corporation, and each is using a different operation including General Electric Co. and National CSS, Inc. time-sharing services and Hewlett-Packard Co. and Burroughs Corp. in-house machines.

Witco got an IBM 360/40 in 1966 and moved up to a 360/50 (running on DOS) in 1973, according to Titelius, who has been with Witco 20 years, having started in the "Tab" room.

DP's Value Recognized

MIS at Witco — until last year — simply did accounting for the corporation. Starting in 1974, corporate management began to recognize the potential value of DP to the corporation.

A new DP director was brought in and charged with the task of making DP meet operational needs. That director got bogged down in trying to satisfy the operational needs of one division, Kendall Oil, and only stayed at Witco a short time.

In 1977, Davis was brought in from Bankers Trust in New York, and he further sold Witco management on the need to support computer services. About a year after Davis arrived, a 370/148 — interim to the 3031 — arrived and Witco computer staffers started familiarizing themselves with the machine.

Witco is currently on the time-sharing threshold, and Titelius hopes to have both the hardware and VSPC software running by the second quarter of 1979. Currently, the 3031 is running the Conversational Monitor System (CMS) in preparation for the move to VSPC.

"We plan to use VSPC for our engineering and laboratory people throughout the U.S. A lot of our data reduction is being done by calculator or by outside time-sharing facilities.

"Where we can replace these, we can reduce out-of-pocket costs," Davis stated. "By replacing the calculators, we should be able to improve speed and accuracy and thus contribute to the bottom line."

The first phase of the time-sharing conversion includes programming an Information Sciences, Inc. personnel system for the entire corporation and an inventory control system for the Organics Division in Perth Amboy, N.J.

The 2M-byte 3031 is supported by eight 3420 tape drives and eight 3330 Model 1 disks, with four 3330 Model 11s expected soon. To support the time-sharing system, there will also be 18 Model 3277 terminals, four 3350 disks and a 3705 controller in the all-IBM shop.

Expanding the Witco operation was not just a matter of upgrading equipment, Titelius noted. The original data center housing the 360/50 was only about 25- by 40 ft. When the 370/148 was brought in, the room had to be expanded an additional 10- by 15 ft, and the floor had to be raised. Everything was done almost simultaneously, Titelius recalled.

When Witco was considering the 3031, it held a bidders' conference with leasing company representatives. The successful bid for both the 370/148 and the 3031 came from Fairfield Marketing Corp. of Fairfield, Conn. Witco now has a seven-year lease.

DG Adds 16-Bit CPUs For Less Than $4,000

By Brad Schultz
CW Staff

WESTBORO, Mass. — Data General Corp. has added two series of general-purpose computer systems to its 16-bit Micronova line. DG's Disk Operating System (DOS) and Real-Time Operating System (RTOS) support both series, which include full-performance, turnkey packages for less than $4,000.

Both DG's MP/100 and MP/200 are driven by the vendor's MN 602 microprocessor. The MP/100 is the least expensive CPU from DG in the vendor's history. A packaged MP/100 with 64K bytes of memory, an 8-slot chassis, an asynchronous communications interface and a power supply costs $2,800. A similarly equipped MP/200 package costs $3,700 and is considered far more powerful than previous Micronovas.

At those packaged system prices, both series have no real competition, according to Edward Zander, DG's manager of microproducts marketing. Digital Equipment Corp.'s PDP-11/03 series in comparable in some respects, he said, but does not offer the same capabilities for less than $4,000.

The MP/100 and MP/200 can execute assembly language, Fortran IV, DG Extended Basic and Business Basic routines, Zander continued. They are intended for both commercial and scientific applications and are sold as packaged systems or in "board-level" form.

A Packaged MP/200 in Commercial Use

According to DG, the MP/100's System Processing Unit (SPU) contains on a 7.5-by-9-in. board the MN 602, an asynchronous interface, a real-time clock, power fail/auto restart and a soft control panel with automatic program load. The asynchronoos interface provides jomper-selectable RS-232C or 20mA interfaces are also provided.

The MP/100 SPU's soft control panel allows any Ascii console to supervise program execution, DG stated. Consoles can also examine and/or modify random-access memory (RAM) locations and CPU registers. The panel is said to support automatic program load from any device.

The packaged MP/100 or MP/200 includes an 8-slot, rack-

(Continued on Page 60)

With Job-Costing System

Mini Sews Up Label Maker's Print Woes

By Marguerite Zientara
CW Staff

AVON, Mass. — A manufacturer of satin cloth labels here has increased speed and improved accuracy with a minicomputer-based job-costing and job-tracking system that "everyone from the floor sweeper to the president" uses, according to the firm's controller.

Waldoroth Label Corp., one of the oldest and largest manufacturer of satin cloth labels in the U.S. and official specialty printer for the 1980 winter Olympic games, currently has roughly 3,000 customers.

At any given time, the firm has approximately 2,500 different specialty items in inventory worth approximately $1 million. It operates 50 separate pieces of precision printing equipment that enable it to supply four distinct printing processes.

Before 1977, Waldoroth manually performed job-cost tracking and used a service bureau to generate sales analysis reports, according to Controller Roy Tilsley.

These functions, however, involved tracking complicated inventory and overhead costs including sales and management expenses, wages for skilled labor and machine use expenses. The figures, in turn, were based on a variety of computations of formidable complexity.

Huge Information Flow

"This job-cost system is enormous in terms of the amount of information that flows through here," Tilsley said. The firm does 500 jobs per week, each of which requires from 10 minutes to two hours in a particular department, he noted. One job might go through 12 departments. In addition, there are 75 to 80 employees who fill out daily time cards.

Manual tracking proved to be cumbersome, lengthy and labor-intensive, and the service bureau arrangement was both slow and inaccurate in developing reports and verifying input data, Tilsley said.

When management began to realize the solution to its analysis problems lay in computerization, the firm established three major criteria for an ideal system.

The first criterion was a data base management capability that would allow the firm to access information at any time.

Secondly, the system would have to be simple enough to be used by the current administrative staff at Waldoroth, thereby eliminating the need for special programming or the hiring of programming personnel. Waldoroth also wanted a system with a comprehensive service program, including system design, hardware installation, staff training and maintenance.

Many Systems Studied

In its search for these qualifications, Waldoroth studied systems from IBM, Modular Computer Systems, Inc., Data General Corp., Digital Equipment Corp., Wang Laboratories, Inc. and Basic Four Corp. It also considered a joint proposal from Northeast Data Systems, Inc. and Mann Data, Inc. and "five or six

(Continued on Page 57)

System Offered to Cut Energy Costs

NEW YORK — "A complete energy management system, which can produce economic benefits in facilities ranging from small to very large."

That's what Lime Trea Computer Systems, Inc. called the first in its projected series of computerized industrial systems called the Lime Trea Energy-Saving System (Less), which employs a Digital Equipment Corp. PDP-11 CPU.

Less is designed to handle load-shedding, load-cycling, alarm-monitoring, timed on/off fonctions and general optimization and control functions. It provides centralized alarm reporting, status displays and a wide variety of reports, Lime Trea stated.

While certain complex functions, such as load shedding are preprogrammed and require the user only to enter some parameters, Less also allows the user to specify control procedures which are unique to his facility. A special-purpose language, Optimization-Oriented Language (Opol), is provided to the user for this purpose.

The Opol language uses commonly understood building terminology and a very simple structure, so that it is suitable for use by engineers or consultants with a minimum of training.

Less is organized as a central station, with up to 256 Remote Intelligent Control units (RIC). Each RIC may be connected to up to 256 digi[illegible] points (input or output) and up to 64 analog inputs and 32 analog outputs. Communication between the

(Continued on Page 60)

Disk Storage Subsystems Ready for DEC Mini Users

ATLANTA — A family of disk storage subsystems designed for users of Digital Equipment Corp.'s PDP-11 minicomputer series is being offered by Equipment Resources, Inc.

Two models are currently available: The ERP02, said to emulate the DEC RP11/RP02 subsystems, and the ERM02, which emulates the DEC RH11/RM02 subsystem. Both models incorporate a Control Data Corp. Model 9762 80M-byte disk drive.

The disk family models are planned to differ only in firmware, Equipment Resources noted, adding that a third model will be introduced in April.

No Modification Needed

The ERP02 and ERM02 were designed to offer identical performance characteristics to the DEC subsystems, an Equipment Resources spokesman said. They will execute all DEC operating systems and diagnostic software and do not require modification, he added.

Each model offers features not found in the original DEC lines, the spokesman noted. The con-

(Continued on Page 60)

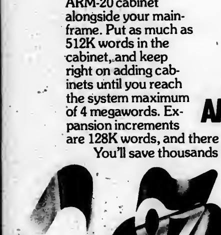
BREAK THE RULES AND SAVE A BUNDLE.

AMPEX MEMORY FOR DEC SYSTEM 20.

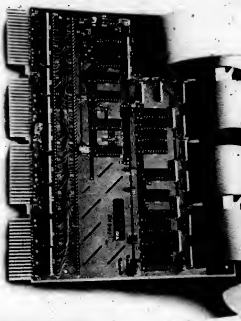
DEC has some complicated rules for expanding their System 20 capacity. Ampex lets you break the rules and save thousands of dollars.

All you do is stand an Ampex ARM-20 cabinet alongside your mainframe. Put as much as 512K words in the cabinet, and keep right on adding cabinets until you reach the system maximum of 4 megawords. Expansion increments are 128K words, and there are no rules or limits.

You'll save thousands of dollars, too. Ampex prices are typically about 40 percent under DEC's for the same amount of added memory.



There's no engineering work for you to do. Ampex ARM-20 memory units plug right into your DEC system, and Ampex ARM-20 memory is faster, more reliable and easier to maintain. (If you're skeptical about that claim, you can write a conditional P.O. that calls for Ampex to take the memory back if your own tests don't prove our performance promise.)



Jess Clark will cheerfully show you how to save a bundle by breaking the rules. Call him at 213/640-0150, and tell him you're tired of trying to unscramble the MB-MA-MOS hassle. Or write to him at Ampex Memory Products Division, 200 North Nash Street, El Segundo, California 90245.

AMPEX MAKES IT EASY.

Mini-Based Testing System Performs Modal Analysis

CINCINNATI — A minicomputer-based dynamic testing and modal analysis system for engineers is now available from Zonic Technical Laboratories, Inc.

The DMS 5004 can be used by the engineer to develop an animated deformation plot or "moving picture" that depicts a structure's relative motion at resonant frequencies when it is subjected to impact, random or sinusoidal excitation, a company spokesman said.

In the field or lab, the system might be used to analyze responses to dynamic forces of machine tools, turbines, automobile and freight car components and stacks of shipping containers, the spokesman explained.

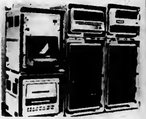
Pinpoints Easily

The value of the system reportedly lies in the early pinpointing of problems and the avoidance of very large price tags. For example, the system has been used to analyze turbines to learn what deformation takes place in the microseconds after a blade breaks off, the spokesman noted.

Other analyses have determined how tiered cases of food products in a freight car react when subjected to the vehicle's undulating movement.

The DMS 5004 consists of a Zonic Data Memory System that can contain two to 16 channels of 1K- to 4K bytes each of memory, antialiasing filters and a Zonic Multichannel fast Fourier transform (FFT) Processor.

It is also made up of a Digital Equipment Corp. PDP-11/34 minicomputer with Structural Dynamics Research Corp. (SDRC) Data Analysis & Display (Dadiv) modal analysis software, a Tektronix, Inc. 4012 display terminal and a Tektronix hard-copy unit. All system commands are entered through the Tektronix terminal keyboard, the spokesman noted.



The DMS 5004

Other Functions

Operable as a direct high-speed system or as a remote system via ordinary telephone lines, the DMS 5004 is reportedly designed for high-volume data analysis. Storage capacity is 5M bytes.

The unit can be used to perform analyses including forward and inverse FFT, time and frequency domain averaging, transfer functions, coherence analyses and curve-fitting to develop an analytical representation of experimental data.

All data is displayed in graphic form on the Tektronix terminal in scaled engineering units. The system is designed to interface with in-house or time-shared computers to combine experimental data with analytical models, the spokesman said.

The 2-channel version of the DMS 5004 costs $92,000. Zonic Technical Laboratories, which is offering a brochure with full details of the system, is located at 8927 Rossash Road, Cincinnati, Ohio 45236.

Small Systems Seminars Set

WOODLAND HILLS, Calif. — Free small business computer seminars are being held each week in three southern California locations by Compal, Inc., a vendor of small business and word processing systems.

Many people are confused with the conflicting claims about small business computer systems, a Compal spokesman said. The free seminars should help businesspeople see for themselves what such a system can do for them, he added.

The seminars require no previous training in DP. They begin by tracing the history of computing and explaining the basics of computer design. Next, the attendees are advised on how to select a suitable system. Finally, such business applications as accounting and word processing are demonstrated.

The seminars are conducted by Gene Murrow. They are held each Tuesday at 10 a.m. in San Diego at 7878 Clairmont Mesa Blvd., each Wednesday at 9:30 a.m. in Studio City at 12321 Ventura Blvd. and each Thursday at 6 p.m. in Beverly Hills at Suite 103, 8500 Wilshire Blvd.

More information is available from Ira S. Kalb at Compal, 6300 Variel Ave., Woodland Hills, Calif. 91604.

Correction

Digital Equipment Corp.'s PDP11/70 and VAX-11/780 "superminis" offer maximum memory capacities of 4M- and 8M bytes, respectively, according to a DEC spokesman. A chart that appeared with the article, "The Year of the Supermini . . . A Look at What's Available" [CW, Feb. 12], erroneously listed top capacities for both systems at 2M bytes.

Modular Housing Fits DEC LSI-11 Micro

OTTAWA — Housing for Digital Equipment Corp.'s LSI-11 microcomputer that reportedly allows expansion to full capability without expander boxes and interconnecting cables for most applications is available from K.O. Mair Associates Ltd.

The Eleven Pac features an 8-slot backplane, 5.25-in. chassis and power and memory supply options. With its modular structure, the Eleven Pac allows rack mount, tabletop or portable unit configurations, the spokesman noted, adding that all boards plug in from the front for easy access.

The firm's BP-11 battery pack is available to provide battery backup.

The Eleven Pac costs $1,300 (Canadian), with 30-day delivery from K.O. Mair Associates at 40 Beech St., Ottawa, Ontario K1S 3J6, Canada.

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IBM Series/1.

IBM has further expanded the range of modular hardware and software available in the highly versatile Series/1. These new features increase your ability to tailor the system you need today and extend that system for tomorrow's data processing requirements.

New Hardware

The 4952 Processor, the newest, lowest-cost member of the Series/1 processor family, utilizes new technologies to combine CPU, storage, address relocation translation function and a new clock/comparator on a single card. Storage is expandable to 128 KB with modules of 32 KB that are pluggable on the processor card.

A family of high performance, large capacity, full-function tape units has been added to the Series/1. The 4969 Magnetic Tape Subsystem comes in six models covering a range of speeds and formats.

The 5250 Information Display System stations (local only) can now be attached to the Series/1. The attachment feature provides for 4 ports and up to 8 stations per attachment.

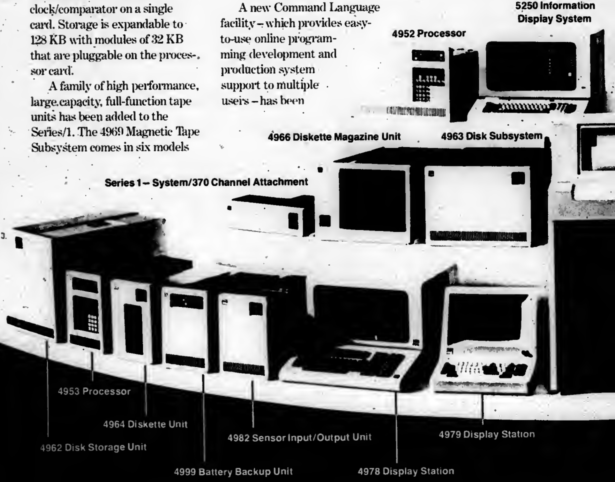
These new components have been added to a hardware menu that now includes 3 rack-mounted processors, matrix and line printers, standard and customized display stations and a wide variety of I/O devices.

New Software

A new Command Language facility – which provides easy-to-use online programming development and production system support to multiple users – has been added to the Realtime Programming System (Version 4).

Also newly available are an Indexed Access Method (IAM) program, which significantly enhances the data management capability of RPS, and a new version of the Program Preparation Subsystem, designed to increase customer program development productivity.

Series/1 also offers two additional operating systems. Event Driven Executive, which provides a powerful system for business and industrial users, has



Broader than ever.

been expanded and is now warranted as an IBM licensed program. And the independent modules of Control Program Support let you tailor a supervisor to your specific needs.

The full line of Series/1 hardware is supported by a comprehensive menu of programming languages which includes Fortran IV, PL/I, Assembler and COBOL. Available, too, are a variety of Series/1 programming packages to meet such needs as energy management, intelligent data entry and interactive processing.

More Capacity and Flexibility

Series/1 is powerful enough to be used in a stand-alone capacity and flexible enough for distributed processing. It can be programmed for a wide scope of tasks, including general business accounting, administrative applications and industrial automation for machine and process control, as well as power management, communications applications and scientific and engineering functions.

IBM Service Support

Series/1 is backed by IBM's extensive service organization. Ongoing IBM maintenance is available at a fixed monthly charge.

To find out how Series/1 can contribute to the growth of your business, contact your IBM Series/1 marketing representative or write the IBM General Systems Division, P.O. Box 2068, Atlanta, Georgia 30301.

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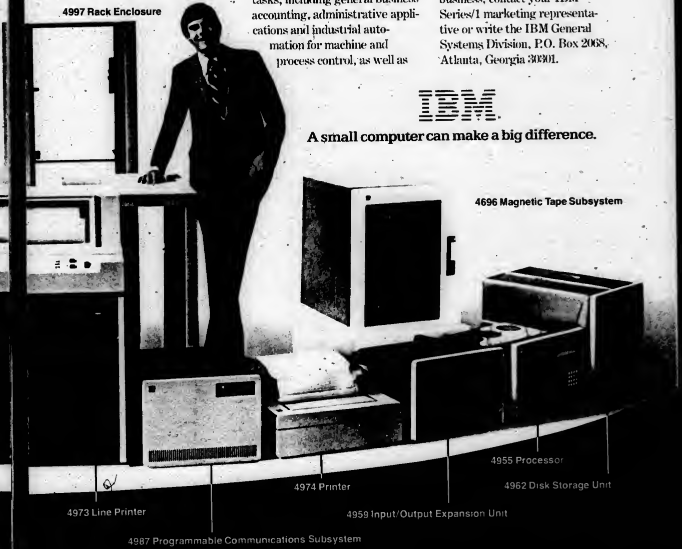
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4696 Magnetic Tape Subsystem
4955 Processor
4962 Disk Storage Unit
4974 Printer
4973 Line Printer
4959 Input/Output Expansion Unit
4987 Programmable Communications Subsystem

Has Data, Word Processing Functions

Mini 'Restructures' Engineering Firm's Business

Special to CW

PORTLAND, Ore. — Storch Engineering Corp. used a time-sharing computer service until the firm called the system to feed it payroll data one day and had a rude surprise. The phone operator intercepted the call to report, "That number is no longer in service."

"It took us months to sort out that mess," Storch's treasurer Jan Case recalled. "We had experienced small inconveniences before, but when our computer service went out of business, it wasn't just inconvenient. It was a disaster."

So Storch turned to Alpine Data Systems of Beaverton, Ore., for help. The turnkey systems vendor delivered a Model WD78 "total information system" comprised of a Digital Equipment Corp. PDP-8 minicomputer with two floppy disks, a letter-quality printer and 9,600 bit/sec CRT terminal.

Alpine provides its customers with computer systems, including CPUs, peripherals, operating and applications software, system service, support, documentation and training. All hardware contained by Alpine systems is manufactured by DEC.

Combined Capabilities

"What sold us on the Alpine system was the combined word and data processing capabilities," Case said. "I wouldn't buy just a word processor.'

"The word processing function is used in the preparation of technical specification reports and also for large mailings," according to Werner Storch, the company's president.

"The minicomputer automates our accounting function so that I can have an almost up-to-the-minute overview of the firm's financial status,". Storch said. The use of the computer allows us to have financial reports at our convenience.

"And finally, the computer aids us in engineering computations. The computer is almost a 'must' for our business. In addition to our in-house Alpine system, we have a half-dozen time-sharing contracts with other firms that offer specialized engineering functions.

'We will, however, put a lot of this on our in-house computer. We will also put recurring engineering problems, such as stand-up framing systems, on the computer," he noted.

Changes Made With Ease

"Various loadings, load combinations and changes in structural configurations can be made with ease to optimize structural efficiency and economy," according to Steven Rinella, a Storch engineer who uses the Alpine system frequently to analyze frames and trusses. Programs can solve many other engineering problems, such as numerical methods and matrix manipulations.

For large problems, the Alpine system is used as a time-sharing terminal. This system allows the firm to input and output information through the disks of the minicomputer, thereby minimizing costly terminal interfacing time with the computer.

"Actually, our biggest problem with the computer is scheduling," Storch remarked. "Everyone wants to use it at once" — from the secretary who uses the word processor, to the bookkeeper who uses the data processor, to the engineers who use the scientific applications.

Case said the word processor improved the appearance of the firm's correspondence and specification reports. "In an engineering firm, typing of specifications can be a nightmare,' he pointed out. "For one thing, they are usually needed yesterday."

"Now our typed specifications are as precise and professional-looking as our drawings," Case stated. "We've eliminated typos such as 'sex bolts' instead of 'hex bolts.' The word processor has eliminated retyping time, which could run up to 12 hours on some proposals.

Free to Make Alternatives

"Writers now feel free to make all the changes they want in revising their texts because they know they're not going to get a lot of hassle from the secretary who has to retype it," Case explained.

The Alpine minicomputer system stores all standard phrases and paragraphs. A few strokes are required to recall them from the computer's memory. This means the typed routine work is produced with a high degree of accuracy and at a much faster pace than before.

"By having the computer do the dull, repetitive, routine work for both data and word processing, we don't make the kinds of mistakes that come from doing a tedious job," Case said.

"Although we've only had the computer a few months, I'm convinced it will be cost-effective, not to mention the other advantages it offers," Storch added.

In addition to the word processing functions, Storch uses the Alpine WD78 system for payroll, accounts payable and general ledger. The firm plans to install a project and time/-expense analysis along with the billing process early in 1979.

Memory Module For DEC Micro

CHATSWORTH, Calif. — A 32K-byte nonvolatile memory module that plugs directly into Digital Equipment Corp.'s LSI-11 microcomputer is available from Micro Memory, Inc.

The MN-1103/2 module stores 16K, 16-bit words and is addressable in 4K-word increments to a maximum of 128K words, Micro Memory said. The module features dual in-line package (DIP) switches and byte control. The user is reportedly able to switch-select portions of memory for write-protection in 2K-word increments to the full 16K-word capacity.

According to the vendor, the module may be installed in any location of the LSI-11 chassis. The unit also fits DEC's PDP-11/03L microcomputer.

Deliverable within three weeks of order, the MN-1103/2 costs $1,489 Micro Memory said from 9438 Irondale Ave., Chatsworth, Calif. 91311.

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The 70-session program is the most comprehensive ever for a conference on data communications, DDP and networking. Divided into 18 major topic groups, the program runs the gamut from datacomm basics to a look at the near future of this, the fastest growing area of data processing. It is impossible for one person to attend all sessions, but the program has been arranged so that attendance is possible in most related-topic sessions. You might encourage some of your associates to come along and share the program load. For further information, call toll-free (800) 225-4620. In Massachusetts, call, (617) 879-4502.

Need a foundation in the basics of data communications? You should attend the DATACOMM SCHOOL.

An updated edition of the famous Datacomm School, a perennial favorite of datacomm newcomers. Four sessions cover the essential "whats," "whys" and "hows" of transmission techniques, interfacing, hardware and software, services and networking in a compact, relatively painless six hours of instruction.

SCH-1	**Fundamentals of Data Communications**
SCH-2	**Understanding Communications Processors and Software**
SCH-3	**Basic Terminals and Terminal Systems**
SCH-4	**Introduction to Networking and DDP**

For the latest developments in terminals take in TERMINAL TRENDS.

Terminals of all kinds continue to proliferate through countless datacomm applications areas. The low cost of microprocessor intelligence not only blurs previous distinctions between "smart" and "dumb" terminals, but also the more basic distinctions between "terminal" and processing unit. These trends (and others) are discussed in a series of sessions dedicated to the proposition that all terminals and terminal systems are not created equal.

TER-1	**More Intelligence in Terminals**
TER-2	**Graphics: Displays and Plotters**
TER-3	**Teleprinter Technology in Transition**
TER-4	**Trends in Transaction-Oriented Data Entry**

To find out what's new in interfacing check out PRODUCTIVITY AT THE INTERFACE.

New ICs, more sophisticated mathematical techniques and differing standards can come together at the interface to impact productivity. Techniques such as statistical multiplexing have infused new vitality into established products, and microprocessors have brought about the evolution of entirely new product designations such as the Terminal Interface Processor (TIP). These sessions instruct users on ways to enhance datacomm performance at both central and remote sites, indeed, at all levels throughout the network.

PRD-1	**How New ICs Redefine Interface Functions**
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PRD-3	**Front Ends and Remote Communications Processors**

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ODP-2	**Current Progress and Future Promise**
DDP-3	**Management Objectives and Considerations**
DDP-4	**To DDP or Not to DDP**

Learn how others do it at DDP APPLICATIONS PROGRESS.

This year INTERFACE focuses on four application areas that together account for billions of dollars in annual datacomm/DDP expenditures. Although, industry-specific applications are cited, the methods used are sufficiently general to permit ready application to other industry areas. These sessions should receive the attention of all forward-looking datacomm managers.

APP-1	**DDP in Financial Services**
APP-2	**DDP in Manufacturing**
APP-3	**DDP in Retailing, Distribution and Transportation**
APP-4	**DDP in Government**

Into network design and optimization? You should attend NET WORKSHOPS.

Samuel Johnson defined "network" as "any thing reticulated or decussated, at equal distances, with interstices between the intersections." Needless to say, Sam never made it big in the world of data communications. Those who have will be speaking at this group of sessions to those who will. Expert speakers, all of whom would define "effective networking" as "profitable," will discuss the general problem of network design, compare vendor offerings, describe user implementations and suggest techniques for optimizing network performance.

NET-1	**Achieving Network Transparency**
NET-2	**Design Optimization**
NET-3	**Network Simulation**
NET-4	**Vendor-Designed Network Architectures**

What's best for you? Shared services or a turnkey network? Find out at the SERVICES SCENE.

Faster, more flexible offerings at lower cost is still a fair summary of what the communications service companies are telling users. On the shared services front, users with vastly different requirements divide network facilities for ready access to specialized data bases and equally specialized "number-crunching." Turn-key network management services are offered to those companies that choose to shun the operational complexities of "do-it-yourself" datacomm. Value-added carriers continue to alter existing services and add new ones, ditto for the common carriers, including the Bell System. A fuller evaluation of these current offerings will advance the thinking of attendees responsible for decision-making in this constantly changing world of datacomm services.

SRV-1	**Shared Services: Specialized Needs**
SRV-2	**Common Carrier Services: More Alternatives**
SRV-3	**Network Management Services: New Ways of Spelling Relief**

SBS, ACS, and XTEN – Find out what it's all about at NEW DIRECTIONS IN NETWORK SERVICES.

Prospective users are advised that Extended Network Services (ENS) can mean increased traffic volumes between previously incompatible systems with increased reliability — and all at lower cost. The acronyms keep coming. SBS, ACS and now XTEN. Yet the pioneers in Value-Added Services tell us that the various benefits claimed are already available to users today. What's it all about? Find out at these sessions on Extended Network Services and prepare to position your company to take full advantage of these services. Learn, too, about the regulatory and competitive issues rapidly coming into focus under pressure from changes in the basic structure of data communications.

NDN-1	**Extended Network Services: Background, Overview and Impact**
NDN-2	**Prospective ENS Offerings: ACS, SBS and XTEN**
NDN-3	**Established Value-Added Network Services: New Challenges and Opportunities for the Packet Pioneers**
NDN-4	**Extended Network Services: Regulatory and Competitive Issues**

Avoid "future shock" and attend TECHNOLOGY UPDATE.

The pace of data communications/DDP technological development continues to accelerate, leaving in its wake many datacomm professionals suffering from a severe case of "future shock." Microprocessors in everything, glass fibers in place of copper, bubble-memories, rooftop earth stations, small computers and terminals everywhere. What will the next ten years be like? Our seers wrap up this group with a penetrating look into the crystal ball.

TEC-1	**Micro Insights for Datacomm Planners**
TEC-2	**Fiber Optics: Current and Future Applications**
TEC-3	**Satellites Come Down to Earth**
TEC-4	**The Next Ten Years in Data Communications**

Crossing boundaries with data? Then attend INTERNATIONAL ALTERNATIVES.

Increasingly, the economies of all nations — including the U.S. — are influenced by multi-national corporations that operate across political as well as geographic boundaries. The need to route enormous masses of data and message traffic from location to location around the world necessitates new services from international record carriers (IRCs) and more complex private international networks. But the technicalities of message protocols and routing are only part of the problems multi-nationals must face. Equally important are the political issues that have arisen with the realization that information is among a sovereign nation's most valuable resources. Consequently, speakers at these sessions will address not only technical topics, but also topics involving the sensitive nature of trans-border data and ways of ensuring that national, corporate and individual privacy will be protected.

INT-1	**Design and Management of International User Networks**
INT-2	**International Carrier Policies and Regulation**
INT-3	**Future Developments in International Telecommunications**

Get tips on how to keep a network up at TECH/NETWORK CONTROL AND PERFORMANCE.

These four sessions discuss the tools and methods available to data communications managers to keep their networks up and performing efficiently. On the assumption that forewarned is forearmed, the first session examines what can be done in the network planning stage to meet performance requirements and minimize the potential for traffic overloads and equipment outages. Subsequent sessions identify performance parameters, discuss methods for determining and acting on those parameters, and examine equipment for pinpointing and correcting faults at all levels.

TCT-1	**Planning for Network Performance**
TCT-2	**Measuring and Optimizing Response Time, Throughput and Reliability**
TCT-3	**Real-Time Tech Control and Network Monitoring**
TCT-4	**Test and Diagnostic Equipment**

Merging the office routine into data communications? Then attend DATACOMM OFFICE OF TOMORROW ... TODAY!

A prominent market research company recently projected that by 1982 annual sales of automated office system elements would reach $15 billion, and that most of these would be linked by communication. Because of their expertise, data communications managers are the likely candidates to control the movement into this area. These sessions examine some of the whys and hows of the products and services already being offered for the office of tomorrow.

OFF-1	**Message Communications: The Forms and Flow of Information**
OFF-2	**Electronic Mail: Current and Future Implementations**
OFF-3	**Telecommunications Tools for the Office**
OFF-4	**Facsimile Systems and Services**

Learn what's happening in communications software. Take a HARD LOOK AT SOFTWARE.

The implementation of complex distributed data processing systems, usually involving access to very large data bases, or perhaps even the distribution of the data base itself, poses an enormous challenge to software designers. At stake is nothing less than the creation of an additional level of software in which the entire network is considered as "the system," integrating and evaluating numerous sub-systems for optimal performance. These sessions are for datacomm managers whose responsibility for "getting the act together" increasingly depends upon their knowledge of various software options and trade-offs.

SOF-1	**Network Operating Systems**
SOF-2	**Communications Monitors**
SOF-3	**Data Base Management Systems: A Datacomm Perspective**
SOF-4	**Software for Evaluating and Diagnosing Performance**
SOF-5	**Software Schemes to Optimize Data Flow**

Issues and Regulations. Get the latest word at the POLICY FORUM.

Any activity as fast-moving as data communications will inevitably spawn a host of policy problems for both Government and the private sector. Where does "data processing" leave off and "data communications" begin? IBM, AT&T, and the rest of us too, would appreciate an answer to that question. And what of the datacomm marketplace? What is its direction in the near term? Finally, there is t question about that marketplace's most importa customer, the U.S. Government. What datacomm related policies are currently implemented by t Government? Should the cumulative impact these policies be eased or strengthened? Are ne Government policies required?

POL-1	**Issues in Regulation and Competition: How They Affect Users**
POL-2	**The Data Communications Market: Analysis, Projections, Scenarios**
POL-3	**Government Information Policy: Changing Needs and the Need f Changes**

Feeling protective about your data? Keep it that way by attending SAFE AND SECURE SYSTEMS.

Always an important issue, security atta supercritical status in a distributed data processi environment. A multifaceted subject, DDP secur encompasses security of the data (both stored a in transit), security of the site (physical securit security of the network (system security), a security of supporting subsystems (reliabili most notably the power links. These sessio address these areas as well as procedures backup and recovery.

SEC-1	**Controlling File Access and Physical Security**
SEC-2	**Seminar on High Reliability and Redundant (Backup) Systems**
SEC-3	**The Constant Line: Equipment f Uninterruptible Power and Transient Suppression**
SEC-4	**Getting Back Up: Audit Trails ar the Recovery Process**

Getting the word? Learn how to deal with it at WORD PROCESSING IN A DATACOMM ENVIRONMENT.

These sessions examine the inter-relations between data processing, data communicati and word processing. The trend toward integrat of these technologies into sophisticated system examined with an eye to the advantages over sta alone systems.

WPD-1	**The Communicating Word Processor**
WPD-2	**Text-Processing Networks**
WPD-3	**Integrating Word and Data Processing Functions**
WPD-4	**Shared-Logic vs. Stand-Alone Word Processing Systems**

There's more than technology to data communications. Find out DATACOMM MANAGEMENT AND ADMINISTRATION.

In many companies, the dependence on technical professionals who manage information systems keeps increasing dramatic As these managers move up the corporate lad they come face to face with a number of difficult problems. These sessions address the m troublesome of these.

MGT-1	**Uncovering High Payoff Datacomm Applications**
MGT-2	**Datacomm Economics for Executives: Controlling Datacomm Costs**
MGT-3	**Evaluating User Pay-Back Schemes**
MGT-4	**Hiring, Training and Motivating Datacomm Personnel**
MGT-5	**Datacomm Organization: Who Manages What?**
MGT-6	**Contract Considerations in a Multi-Vendor Environment**

Wondering about all-digital networks? Get your questions answered at THE PROMISE OF AL DIGITAL COMMUNICATIONS.

Hundreds of companies, tens of thousand people and billions of dollars are involved mammoth effort to convert telco and user switching and transmission facilities from existing hybrid analog/digital base to an all-di orientation. Even that last analog holdout, human voice, is at last beginning to surrend digitization at the handset level. Speakers at t sessions will address the anticipated user ben of this process, examine present and planned d switching systems of this process, examine pre and planned digital switching systems for private and telco users, and shed some light o dark mysteries of voice digitization.

DIG-1	**All-Digital Communications: Background and Overview**
OIG-2	**Digital Switching Systems**
DIG-3	**Digitized Voice: Problems and Prospects**

INTERFACE '79 Exhibits – for "Hands-On" Experience

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Extend your learning experience from the Conference to the INTERFACE '79 Exhibit Floor . . .the most comprehensive display ever of datacommunications/DDP products and services under one roof. This is a once-a-year opportunity to match your needs to what's on the market -- more than 225 companies occupying over 800 booths on a 300,000 square foot exhibit floor -- a veritable three-dimensional "yellow pages". Only, this time, you'll have to do a little walking.

Virtually every product and service will be offered the datacomm/DDP/dp professional: Mini- and micro-based systems, subsystems and peripherals ... Distributed data processing systems ... Modems and multiplexers ... Concentrators ... Front-end processors ... Terminals of all types ... Interface devices of different kinds ... Packet switching ... Word processing equipment ... Technical control and test equipment ... Data base and communications software ... Network services ... and more. By far the largest display of data communications/DDP and data processing equipment, systems and services ever assembled in one location. INTERFACE '79 is the world's largest data communications/DDP Conference and Exposition ... and the second-largest computer-related show in the United States.

Current Exhibitor List

ABLE COMPUTER TECHNOLOGY, INC.
ADC TELECOMMUNICATIONS
ADMINISTRATIVE MANAGEMENT
ALANTHUS DATA COMMUNICATIONS CORP.
AMCO ENGINEERING CO.
AMERICAN MODEM CORP.
AMERICAN SATELLITE CORP.
AMERICAN TELEPHONE & TELEGRAPH (AT&T)
ANADEX INC.
APPLIED DIGITAL DATA SYSTEMS (ADDS)
ASTROCOM CORP.
A-TEAM, INC.
ATLANTIC RESEARCH CORP.
AUERBACH PUBLISHERS INC.
AUSTRON, INC.
AVANTI COMMUNICATIONS CORPORATION
AZURDATA, INCORPORATED
BASIC/FOUR CORP.
BELDEN CORP.
BELL & HOWELL (AUDIO VISUAL PRODUCTS DIVISION)
BENWILL PUBLISHING CORP.
BEXDATA LTD.
BILLINGS COMPUTER CORP.
CABLE & WIRELESS LTD.
CAMBRIDGE TELECOMMUNICATIONS INC.
CANOGA DATA SYSTEMS
CANSTAR COMMUNICATIONS
CAP-CPP, INCORPORATED
CARTERFONE COMMUNICATIONS CORP.
COASTAL DATA SERVICES, INC.
CODEX CORPORATION
COGNITRONICS CORP.
COMDATA CORPORATION
COMMUNICATIONS NEWS
COMMUNICATIONS SATELLITE CORP. (COMSAT)
COMPUGRAPHIC CORPORATION (COMPUTER PRODUCTS DIV.)
COMPUSLIDE
COMPUTER COMMUNICATIONS, INC.
COMPUTER DECISIONS
COMPUTER DESIGN
COMPUTER DEVICES INC.
COMPUTER MARKETING, INC.
COMPUTER NETWORKS JOURNAL
COMPUTER ROOMERS, INC.
COMPUTERWORLD (CW COMMUNICATIONS/INC.)
COMTEN, INC.
CONTROL DATA CORPORATION
CPT CORP.
CUBIC CORP. (WESTERN DATA DIVISION)
CUMMINS-ALLISON CORP. (DATA SYSTEMS DIVISION)
CUTLER-WILLIAMS INC. (RESOURCE MGMT. DIVISION)
CYGNUS COMMUNICATIONS
DATA CHANNELS
THE DATACOM COMPANY
DATA COMMUNICATIONS
DATA FLO CORP.
DATAGRAPHIX, INC.
DATAMATION
DATAMEDIA CORPORATION
DATAPOINT CORP.
DATAPOINT (INFOSWITCH DIV.)
DATA PRINTER CORPORATION
DATAPRO RESEARCH CORP.
DATA SET CABLE CO., INC.
DATA SPECIALTIES, INC.
DATA SWITCH
DATA TERMINALS & COMMUNICATIONS
DATUM, INC.
DELTA DATA SYSTEMS CORP.
DEVELCON ELECTRONICS, INC.
DIABLO SYSTEMS, INC.
DIALOG SYSTEMS, INC.
DIGI-LOG SYSTEMS, INC.
DIGITAL COMMUNICATIONS ASSOCIATES, INC.
DIGITAL COMMUNICATIONS CORPORATION
DIGITECH DATA INDUSTRIES, INC.
DMW GROUP, INC.
DOCUMATION INC.
DYNATECH DATA SYSTEMS
EDGE TECHNOLOGY
EDUCATIONAL DATA SYSTEMS
EECO
ENA DATASYSTEMS, INC.
EPICOM, INC.
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EXECUCALL
EXPANDOR, INC.
EXTEL CORP.
G.A. FIELD
GANDALF DATA INC.
GENERAL AUTOMATION INC.
GENERAL DATACOMM INDUSTRIES, INC.
GENERAL ELECTRIC CO.
GRAPHIC CONTROLS CORP.
HALCYON
HAMILTON/AVNET ELECTRONICS
HAMILTON SORTER CO., INC.
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HEKIMIAN LABORATORIES, INC.
HEWLETT-PACKARD CO.
HONEYWELL, INC. (AVIONICS DIVISION)
HONEYWELL INFORMATION SYSTEMS
IBM CORP. (GENERAL SYSTEMS DIVISION)
I.D.C.M.A.
INCOTERM CORPORATION
INDUSTRIAL DATA TERMINALS
INFOREX, INC.
INFORMER, INC.
INFOSYSTEMS MAGAZINE
INFOTON, INC.
INFOTRON SYSTEMS CORP.
INTEGRAL DATA SYSTEMS, INC
INTERNATIONAL DATA CORP
INTERNATIONAL SYSTEMS
INTERSTATE ELECTRONICS CORPORATION
INTERTEL INC.
C. ITOH ELECTRONICS, INC.
ITT (ELECTRO OPTICAL PRODUCTS DIVISION)
KAPUSI LABORATORIES
LANIER BUSINESS PRODUCTS, INC.
LEAR SIEGLER, INC.
LEASAMETRIC
LEXITRON
MEGADATA CORP.
MEMOREX CORPORATION
MEMOTEC SERVICES CORP.
MFE CORPORATION
MICOM SYSTEMS, INC.
MICROFORM DATA SYSTEMS
MICRO-TERM, INC.
MI^2 CORP.
MINI-MICRO SYSTEMS
MITRON SYSTEMS CORP.
MOHAWK DATA SCIENCES CORP.
MOTOROLA INC. (GOV'T. ELEC. DIVISION)
MSI DATA CORPORATION
MULTI-TECH SYSTEMS, INC
NCR CORP.
NEC INFORMATION SYSTEMS, INC.
NETWORK ANALYSIS CORP.
NEW ERA RIBBON & CARBON CO., INC.
NIXDORF COMPUTER CORP.
NORAND CORPORATION
NORFIELD ELECTRONICS, INC
NORTHERN TELECOM SYSTEMS CORPORATION (SYCOR DIVISION/DATA 100 DIVISION)
OKIDATA CORP.
OLIVETTI CORP. OF AMERICA
PARADYNE CORP.
PBSI DATA COMMUNICATIONS
PENRIL CORP. (DATA COMMUNICATIONS DIVISION)
PERMA PRODUCTS CO.
PERSCI, INC.
PHONE 1, INC.
PLEXUS CORP.
PRENTICE CORP.
PRINTRONIX, INC.
PULSECOM (DIV. HARVEY HUBBELL, INC.)
OANTEL CORP.
OANTEX
QUESTRONICS, INC.
OUME
RACAL-MILGO, INC.
RACAL-VADIC, INC.
RANDAL DATA SYSTEMS (BUSINESS SYSTEMS DIVISION)
RAPICOM CORP.
RAYTHEON DATA SYSTEMS
RESEARCH INC., (TELERAY DIV.)
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SPECTRON CORP.
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TEC, INC.
TEK-COM, INC.
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TELCON INDUSTRIES, INC.
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TELECOM SYSTEMS GROUP INC.
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VALTEC CORPORATION (FIBEROPTICS DIVISION)
VEN-TEL INCORPORATED
VIA WEST INC.
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WESTERN UNION DATA SERVICES
WESTERN UNION TELEGRAPH CO.
WHITSED PUBLISHING LTD.
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WORD PROCESSING WORLD
WUI, INC.
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INTERFACE '79 Program Committee members are more than names — they are all active participants. All will chair one or more sessions. And all will speak. They, along with other professionals in data communications/DDP/dp offer you, the attendee, full tutorial and applications exposure that is current, timely and without "sell".

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Network Management Assoc., Inc.
Huntington Beach, CA

Registration Information

Based on conference registrations and hotel reservations already made, and the rate at which new ones are coming in daily, attendance at INTERFACE '79 may greatly exceed our original projection estimates of 15,000 attendees.

This means that the opportunity to stay at the hotel of your choice may be limited.

ACT NOW. Complete and mail your registration today. Or for faster action, call us. We'll do all the rest.

Conference Hotels for INTERFACE Attendees:

Hotel	Single	Double	Suite
Ascot House	$32	$38	—
Avenue Motel	$28	$32	—
Best Western	$38	$46	
Bismark	$32-48	$42-50	$65 Up
Blackstone	$29-42	$42-52	$65 Up
Conrad Hilton*			
Minimum	$35-48	$47-53	$65 Up
Average	$48-47	$56-59	—
Superior	$62	$62	—
Towers	$44-67	$56-67	—
Towers Deluxe	$67	$67	—
Continental Plaza	$55-77	$67-89	$175 Up
Essex Inn	$38	$44	$90 Up
Holiday Inn Chicago Downtown	$33	$37	—
Holiday Inn City Centre	SOLD OUT	SOLD OUT	—
Holiday Inn Lake Shore Drive	SOLD OUT	SOLD OUT	—
McCormick Inn	SOLD OUT	SOLD OUT	SOLD OUT
Midland	$36-44	$44-52	$90 Up
Palmer House			
Standard	$45	$59	$130 Up
Average	$50-60	$64-74	--
Deluxe	$65	$79	
Towers	$35-70	$69-84	$185 Up
Pick Congress	$39	$51	$105 Up
Playboy Towers	$39	$44	—
Ritz Carlton	$65-97	$65-97	$225 Up
Sheraton Plaza	$52-56	$64-68	$65 Up
Water Tower Hyatt	$52	$64	—

***Headquarters Hotel**

Shuttle Bus Service will be available between all conference hotels and McCormick Place.

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Data Communications
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Use a seperate form for each member of your organization. Make copies for additional registrants

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Please Reserve Hotel Accommodations At
(List Three Hotels in Order of Preference)

1	
2	
3	

Room Preference: ☐ Single ☐ Double ☐ Suite

Estimated Arrival:

Date ________ Time ________

Departure:

Date ________ Time ________

☐ Guaranteed Late Arrival

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Circle one in each group:

BUSINESS OR INDUSTRY CLASSIFICATION
30 **Finance**: Banking, Insurance, Securities & Credit
33 **Service Industries** (except Computer & Datacomm Services)
36 **Transportation Services:** Land, Sea, Air
38 **Manufacturing and Processing:** Except Computer & Peripheral Equipment
40 **Utilities:** Communications (Common & Specialized Carriers) Pipelines and Energy
42 **Education:** College, University and School Systems
43 **Health Care.** Hospitals
44 **Government:** Federal, State, Local including Military
45 **Manufacturing.** Computer & Peripheral Equipment
47 **Computer Services:** Service Bureaus, Software, Time Share and EDP Consultants
49 **Communication Services:** Broadcast, Newspaper, Newswire, Publishing
50 **Distribution:** Wholesale & Retail
51 **Representatives/Dealers:** Computers & Data Communications Products
52 **Professional Services:** Accounting, Legal, etc
59 **Other** (Please specify) ________

YOUR TITLE
01 Corporate Officer: Chairman, President, Vice President, Controller, Treasurer, Secretary
02 Director
03 Manager,
04 Supervisor
05 Staff Member
05 Editor
07 Consultant
09 Other (Please specify) ________

YOUR FUNCTION
20 Administration
21 Finance
22 Data Processing
23 Data Communications
24 Telecommunications
25 Engineering
26 Sales/Marketing
27 Production
28 Consulting
29 Other (Please specify) ________

USAGE CATEGORY
60 End User
62 End User Buying in OEM Quantities
61 OEM

SIZE OF ORGANIZATION
70 Under 100
71 100-499
72 500-999
73 1000-4999
74 Over 5000

In the event of cancellation, registration fee will be refunded if notice is received prior to March 9, 1979. If received after March 9, 1979, fee will be applied toward registration for Data Communications INTERFACE '80.

Cage Holds Intel Modules

WALTHAM, Mass. — A rack-mounted card cage that provides slots for up to nine Intel Corp. Multibus boards is available from Computer Marketing, Inc. (CMI).

The unit also offers power busing, bus signal terminators and a provision for mounting the auxiliary connectors.

The Model CC-80 card cage includes a cooling fan; a second fan is optional. Spade lugs are used for power connection, the vendor noted, adding that the rack-mounting flanges are reversible to allow front access to either the cards or the bus backplanes.

With OEM discounts available, the CC-80 costs $350, CMI said from 257 Crescent St., Waltham, Mass. 02154.

Kybe Unveils Mini Disks

WALTHAM, Mass. — Certified 100% error-free and reportedly rated to last more than 12 million passes without disk-related errors or "significant wear," a line of mini flexible disks has been announced by Kybe Corp.

The 5.25-in. disks are said to be compatible with soft-sector, 10-sector and 16-sector mini disk drives used in word processing.

The disks are available off-the-shelf and are packed 10 to a box. Hard plastic library cases are also available.

The disks are priced from $3.75 a piece. Kybe is located at 132 Calvary St., Waltham, Mass. 02154.

Directory Lists Vendors

HUDSON, Mass. — A 400-page directory of vendors and systems houses addressed to the needs of minicomputer users is available from Sentry Publishing Co.

An alphabetic index lists each supplier's address and phone number as well as product descriptions, industries and applications served, top executives, number of employees, annual sales and the make and model of the mini- and microcomputers used in the firm's products.

A geographic index lists suppliers by city and state to help users locate the closest one available. An application index covers more than 100 applications and the firms having expertise in each task category. "Before you set out to implement an unfamiliar application, consult this index to find the suppliers who may have already perfected the solution to your precise problem," Sentry advised.

Sentry's *1979 Directory of Systems Houses & Minicomputer* OEMs normally costs $347 but is available for $307 if payment is sent with the order, Sentry said from 5 Kane Industrial Drive, Hudson, Mass. 01749.

Mini Dispels Label Maker's Woes

(Continued from Page 47)

OEMs that offered DEC and DG equipment," Tilsley noted.

After careful study, the firm decided to go with hardware vendor Northeast Data Systems and software supplier Mann Data, two firms that often co-bid in an effort to provide information management systems for "particularly complex manufacturing applications," according to a spokesman.

The Massachusetts-based firms proved to have a "very friendly, very versatile and extremely powerful" system to offer, according to Tilsley. "They had a very good operating system and data base management system, which no other companies had to any degree."

Conversion to the system went very smoothly, Tilsley said, partly because Waldoroth transferred some of the service bureau's data onto tape in preparation for the computer's arrival.

Some of the sales and customer data was put into readiness before the new system was installed. "So when the computer came in, we had 5,000 customers immediately up and running, and then we began development of the job-costing function," Tilsley explained.

After 30 days of running parallel, the system was on its own.

System Components

Installed in September 1977, the system consists of a Microdata Corp. Reality minicomputer with 48K bytes of main memory, a 25M-byte disk drive, a 300 line/min drum printer and seven CRT terminals. After one year, Waldoroth upgraded the equipment to a Microdata Reality Royale minicomputer, resulting in increased processing speed, Tilsley said.

The firm also recently installed a word processing unit connected to the minicomputer. The Diablo Systems, Inc. word prucessing unit runs on software that came with the system.

Detailed Analyses Possible

The system has proved to be "more reliable than I'd anticipated," Tilsley noted. As planned, Waldoroth primarily uses it for the job-costing function and now obtains detailed analyses of each job.

"We can examine profitability from eight to 10 different angles," Tilsley said. "In a matter of minutes, I can look at profit in terms of salesmen, materials, departments or other aspects of our business."

Hundreds of Reports

Waldoroth also uses the system to generate hundreds uf management reports indispensable to a company with $6 million in sales, 155 employees and a large capital investment.

The firm can use the system fur direct mailing and fur personnel analysis. It can keep records on each employee that include information on salaries, histories of raises, promotions and overtime hours.

DEC Users Gain Disk

(Continued from Page 47)

truller reportedly uses an automatic self-test capability plus extensive subsystem diagnostics in on-board firmware. Operating functions have been added to enhance the system's performance, he stated.

Standard Slots

The disk controller employs only two printed circuit boards, which reportedly can be plugged into "any pair of standard slots to minimize mounting space requirements."

Both the ERP02 and ERM02 subsystems cost $13,950.

Equipment Resources, Inc. is located at Suite 120, 120 Interstate N. Parkway E. Atlanta, GA. 30339.

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The outcome was actually two models. The HP 2621A, which sells for $1450. And the HP 2621P, which has a built-in printer, costs $2550. You obviously want the sharpest display made. So we used the 9x15 character cell you see on every HP CRT terminal, including the top-of-the-line. And, to help you look back at the data you've entered, we provided two full pages of continuously scrolling memory.

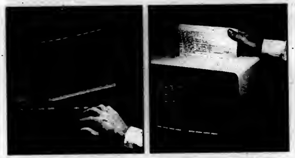
We designed the keyboard like the familiar typewriter, so you don't have to waste time relearning it. We built in eight function keys, too. These control the cursor, rolling and scrolling. And, to make life easier, they're labeled on the screen for self-test, configuration, display and editing.

Editing? On a simple terminal? Certainly. We included character and line insert and delete, clear line and clear display. And, since the 2621 keeps your input separate from your CPU's, you can edit data before sending it to the computer. All without writing a line of system software.

Since flexibility is important in interfacing, we included a user-definable return key that will send your computer whatever code it expects. We also made our terminals compatible with RS232C and Bell 103A, and able to communicate with your CPU at 110 to 9600 baud.

If you need hard copy at your fingertips, take a look at the HP 2621P. With a keystroke, its built-in 120 cps thermal printer will deliver a printout from the screen in seconds.

So why don't you check out the HP 2621 by calling the nearest HP sales office listed in the White Pages. Or send us the coupon. Then see for yourself how sophisticated a simple CRT terminal can be.



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DG Adds $4,000 Systems To 16-Bit Micronova Line

(Continued from Page 47)

-mountable chassis with SPU; 8K-, 16K, 32K- or 64K-byte memory board and a power supply. Users can specify additional 8K-, 16K, 32K- and 64K-byte RAM boards, the vendor noted. Additional programmable read-only memory (Prom) modules are available for use in applications that require programs or data to be fixed within the system.

Altogether, 128K bytes of RAM/-Prom can be stored on two boards in the MP/100, Zander said. Previous Micronovas reportedly required a half-dozen boards to allow this capacity.

Functions of MP/200

The MP/200 features DG's Nova 16-bit multifunction instruction set, including signed and unsigned multiply/divide; load-and-store byte operations; multiple addressing modes; multiple accumulators (two of which can be used as index registers); and hardware stack and frame pointers with stack overflow protection. Other features are 16-level programmed priority interrupt and separate memory and I/O buses, including a 16-bit parallel memory bus.

An asynchronous interface board connects teleprinters and CRT terminals to the MP/200's I/O bus. The board provides single-line interface and jumper-selectable device codes; transmission speeds in the 110- to 19,200 bit/sec range; RS-232C or 20mA current loop interface levels as well as variable character lengths, stop bits and parity (odd, even or none).

The board also gives the MP/200 full modem control, DG said, including automatic-answer capability. Digital, analog-to-digital and digital-to-analog I/O interfaces are available. These interfaces reportedly let the MP/200 connect to a variety of data acquisition and control subsystems.

For example, the MP/200 can access the Micronova Communications Subsystem, which includes asynchronous multiplexers and synchronous line controllers. DG's Communications Access Manager (CAM) provides the MP/200 with software support under DOS or RTOS. CAM and CAM-supported remote job entry (RJE) 80 and Hasp II emulation packages allow users to configure the MP/200 to serve networks as terminal concentrators, terminal cluster controllers and intelligent terminal systems, the vendor said.

Details on Timing

According to DG, the MP/100 can execute an ADD instruction in 2.4 microsec, while the MP/200 requires only 840 nsec. The MP/100's memory cycle and memory reference times were put as 960 nsec and 2.9 microsec, respectively.

DG did not release those last two benchmarks for the MP/200, but said the system requires 4.92- and 6 microsec to perform MULTIPLY and DIVIDE, respectively. The MP/200's direct memory access channel allows throughput in the 300K- to 3.7M byte/sec range, DG stated.

Both the MP/100 and MP/200 can accept DG's Micronova Cartridge Disk Subsystem, which provides 10M bytes of on-line storage; 5M bytes of fixed storage; and 5M bytes of removable storage. This subsystem reportedly includes an integral controller and can be mounted in the same rack as the CPU or in a separate enclosure.

DG's diskette subsystem provides the MP/100 or MP/200 with 315K bytes of single-density, single-drive storage or 630K bytes of single-density, dual-drive (on-line) storage. The subsystem includes an integral controller and can be mounted with the CPU or separately.

The least expensive MP/100 package, which costs $1,700, includes the system's SPU with 8K bytes of memory, an 8-slot chassis, an asynchronous interface and a power supply.

The high-end MP/100 package includes SPU, 64K bytes of memory, an 8-slot chassis, an asynchronous interface, a power supply, a Dasher TP1 printer, a 10M-byte disk subsystem and a half-bay cabinet. This package costs $14,600.

A board-level MP/100 that includes the MN 602, an asynchronous interface, automatic program load, a soft control panel, 32K-byte RAM and sockets for 32K bytes of erasable Prom costs $1,500. In quantities of 25, this configuration costs $1,170.

A board-level MP/200 with an asynchronous interface and 64K bytes of memory costs $2,250; in quantities of 25, the configuration costs $1,755.

Delivery is within 90 days of order, DG said. The systems may be purchased from the vendor at Rt. 9, Westboro, Mass. 01581 or through various Micronova distributors.

Energy System For Cost Cuts

(Continued from Page 47)

central station and the RICs may be hard-wired or conducted by telephone lines.

The RICs may be configured in a star network and multidropped on each arm of the star. Up to 64 RICs may be multidropped on a hard-wired link and eight on a telephone line, Lime Trea said.

The central station consists of a DEC PDP-11 CPU, disk storage, an operator console, a printer, communications equipment and optional devices. The processor/disk combinations include a PDP-11/04 with RX02 floppy disk drives, a PDP-11/34 with RL01 disk drives and PDP-11/60 with RK07 disk drives.

A nongraphic CRT is the standard operator console. Graphic CRTs, monochrome or color, with or without a slide projector are also availabla.

Printer speeds range from 30 char./-sec to 600 line/min. Optional central station devices include LED annunciator panels, custom map displays, additional independent operator consoles or slave displays and a communication link to a large mainframe using any standard protocol.

The cost of a small central station starts at $25,000, with RIC prices ranging from $2,500 and upwards depending on the number of digital and analog points, the vendor said from One Pennsylvania Plaza, New York, N.Y. 10001.

In-House Micro Cures Medical Records' Ills

By Ann Dooley
CW Staff

PORTLAND, Ore. —A group practice comprised of seven vascular surgeons here found its medical records and accounts receivable system in poor health and prescribed a microcomputer cure.

Northwest Surgical Associates had been using a service bureau to process its patients' records and billing data, but found it slow and inaccurate.

Installed Nov. 1, the microcomputer has given the office much better control over accounts receivable and a more efficient collection system, according to Virginia Foster, bookkeeper for the medical group.

The micro was a good investment because it will be able to pay for itself within a few years, she noted. No one here knew very much aboot computers, but Dr. Scott Page, one of the members of the group, became interested in computing when he built his own microcomputer and was able to persuade the others to install one at the office. It's "been a godsend," Foster stated.

Time Savings 'Amazing'

The amount of time saved is amazing, she noted, adding that "it's changed our lives here." What used to take three days now takes less than a day to accomplish.

Furthermore, the system has divided the work so as to give both doctors and clerical help more time to perform other tasks."It really saved us from what osed to be utter chaos and has improved out retrieval and collection methods," she said.

The microcomputer the doctors selected was a Pertec Computer Corp. Mits Altair system. It was chosen because "it did what we wanted it to do, Page said. Most of the other systems were oriented toward commercial business operations or inventory-control operations. The Mits system could be implemented with the fewest modifications, Page said.

Another reason for selecting the Pertec system was that it could be expanded into a hard disk system to handle more patients or do different applications. Currently, 550 active patients files are stored in the system.

The Northwest Surgical Associates' system includes the Mits CPU with 64K bytes of memory, a dual floppy disk drive, a Qume Corp. line printer, a Soroc Technology, Inc. CRT and Disk-Extended Basic programming. The software is Pertec's Medical Billing and Claims System (Medbacs) modified slightly by Page to fulfill the group's needs.

Billing Procedures Improved

The system handles billing for the medical group and, as Foster explains it, sepa-

(Continued on Page 62)

Speech Synthesizer Fits TRS-80 Microcomputer

SANTA MONICA, Calif. — Computalker Consultants is offering the Model CT-1T, a speech synthesizer specifically adapted for the Radio Shack TRS-80 microcomputer with Level II Basic and a minimum of 16K random-access memory (RAM).

Nine acoustic-phonetic parameters transmitted on the microcomputer bus control the synthesizer. These parameters control the perceptually and physiologically fundamental aspects of speech as determined by phonetic research, the firm said.

The Model CT-1T can be operated in two modes, Direct Parameter Control and Phonetic. It is supported by a library of software, which is available on 5.25-in. diskette or standard cassette.

A self-contained unit, the Model CT-1T is packaged in a 6 in. high by 4 in. wide by 12 in. long chassis and has its own 110 Vac power supply. The interface circuit board contains an on-board, two-Watt audio amplifier, an S-100 connector fot the firm's CT-1 speech synthesizer board and a Radio Shack compatible edge connector.

Phono Jacks

An interconnect cable links the unit to the TRS-80 bus connector on either keyboard or expansion interface.

Standard phono jacks provide conoections for external speakers, headphones or an external amplifier.

The Model CT-1T includes the self-contained unit, the interconnect cable, the user manual and the software. The unit costs $595 but can be purchased for $95 for a limited time from Computalk Consultants at Suite A, 1730 21st St., Santa Monica, Calif. 90404

Key-to-Disk Software Runs On Zilog Z80 Micros

ROCKFORD, Ill. — Key-to-disk software (P1-KTDS) designed to run on 8080s and Zilog, Inc. Z80 microcomputers is being offered by Phone 1, Inc. It supports four CRTs, four floppy disk drives, a line printer and 3780 communications.

The P1-KTDS package allows up to four CRT users to define and select as many as four screen formats each. A format may contain as many as 40 specified fields. Constant data fields may also be specified.

In addition to data entry, data verification can be performed on each field that is specified as such.

Separate Drives

Each of the four users has a separate diskette drive that stores the formats and data records for the particular CRT assigned to the drive.

The P1-KTDS source module on CP/M or FDOS III compatible diskette, a limited-use license, a user's manual and four sets of keyboard decals cost $2,500. The user's manual is $35.

Phone 1 can be reached through P.O. Box 1522, Rockford, Ill. 61110.

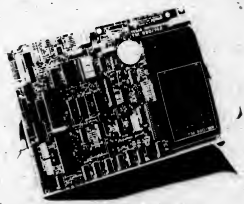
Board for Z80 Micros Debut

WESTLAKE VILLAGE, Calif. — A 48K-byte dynamic random-access memory (RAM) board, compatible with Zilog, Inc. Z80-based S-100 bus microsystems, has been introduced by Vector Graphic, Inc.

The board uses state-of-the-art 16K byte dynamic chips. Its capacity is equal to that of competitive 16K-bit boards, but reportedly costs about half the price.

Incorporating the Z-80 refresh mode for transparent refresh, the board consumes less than four watts of power. Each board is tested with more than 400 million error-free read/write cycles before being thermally cycled.

Fully assembled, the Vector Graphic 48K-byte dynamic RAM board costs $695. Vector Graphic is at 31364 Via Colinas, Westlake Village, Calif. 91361.



The TM 990/189M Single-Board Computer

Board Unveiled by TI Acts as Learning Aid

HOUSTON — A self-contained, completely assembled, single-board microcomputer system designed as a learning aid for hands-on experience and instroction has been announced by Texas Instruments, Inc.

Designated the TM990/189M, the unit comes with a user's guide and a detailed applications textbook that can be used as a primary course book for college-level classes on 16-bit microcomputers, according to the firm.

The board has 1K bytes of random-access memory (RAM) that can be expanded on-board to 2K bytes. In addition, 4K bytes of read-only memory (ROM) can be expanded on-board to 6K bytes.

The 4K bytes of ROM contain the system monitor (Unibug) aod a symbolic assembler. Mass memory storage can be accomplished via the audio-cassette interface.

Alphanumeric Keyboard

Built into the unit is a 45-key alphanumeric keyboard, a 10-digit, seven-segment display and a 32-character buffer. The display can be shifted to the right or left to view any 10 digits of the buffer.

The sytem includes a series of addressable LEDs, coupled with a piezoelectric speaker for audio signals. When the micro is powered up, a group of four LEDs flash on, the speaker beeps and the display signals, "CPU ready." Powering up the micro not only clears the system, but also serves for self-diagnosis.

The TM990/189M costs $299. The TM 990/519, a suitable power supply, costs $65. TI can be reached through P.O. Box 1443, M/S 653, Houston, Texas 77001.

Intel Unveils Eprom/ROM Expansion Board

SANTA CLARA, Calif. — Intel Corp. has unveiled its ISBC 464 erasable programmable read-only memory/read-only memory (Eprom/ROM) expansion board. The ISBC 464 reportedly fills the read-only expansion requirements of single-board systems containing Intel's high-performance 16-bit ISBC 86/12 system.

Compatible with Intel's industry standard Multibus architecture, the ISBC 464 board is the first Eprom ROM board that can be used with ISBC 86 or ISBC 80 single-board computers or with both in a multiprocessor environment, the firm said. The board is also compatible with the 16-bit words and 20-bit addressing of the ISBC 86/12 board and can accommodate the 8-bit words of the firm's existing line of 8-bit single-board computers.

The ISBC 464 is the first ISBC expansion board to use Intel's high-density 2732 Eproms. Total memory can be tailored to meet system needs using Intel's 2758, 2716 and 2732 Eproms or 2316E ROMs. The board takes advantage of the standby power mode of these components and operates from a single 5-volt power supply, reducing power consumption by as much as 40%, according to the firm.

The ISBC 464 contains 16 sockets that provide a maximum of 64K bytes of nonvolatile memory expansion. The available Eprom/ROM devices are the 8K-bit 2758 Eprom, the 16K-bit 2716 Eprom/2316E ROM and the 32K-bit 2732 Eprom. Although only one device size can be used, Eprom and ROM components can be mixed on the same board.

Switch-Selectable Access

The board operates with one of 15 switch-selectable memory access times ranging from 35- to 1,550 nsec, allowing the board to be tailored to the performance of the installed components, the firm said.

The board can operate in one of two modes, the 8-bit-only mode and the 16/8-bit mode. The 8-bit-only mode is for systems limited to 8-bit data, and the 16/8-bit mode allows 16-bit words to be accessed by 16-bit processors.

The ISBC 464 board costs $495 from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

TRS-80 Sources Listed

LAKE HAVASU CITY, Ariz. — Computermat has published the "TRS-80 Software Source," listing more than 125 sources of Radio Shack TRS-80 software.

The listings include each supplier's name, address and phone number, as well as the program's catalog number, the level of Basic required, the memory needed, the program's description and its price. The "TRS-80 Software Source" alphabetically lists and groups programs by supplier, classification and media source.

The source listing is published three times a year, and each issue will be updated with sources and names of available programs.

The publication costs $10 a year of $3.95 per issue from Computermat, which can be reached through P.O. Box 1664, Lake Havasu City, Ariz. 86403.

Micro Cures Records' Ills

(Continued from Page 61)

rates patients into four groups according to the times they were seen by the doctors. This permits the office to send out bills at appropriate intervals. It is no longer deluged with calls from patients all at one time as it once was, Foster said. This way, the patients are getting faster and more personalized service, she added.

The Mits system also prints a daily hospital list, which shows each doctor where in the hospital his patients are located, what has been done for them, their surgery dates and diagnoses. The printer prints the information on a daily schedule for each doctor.

In addition, the system prints each doctor's billing statements and handles insurance claim forms and aged accounts receivables. It automatically purges old accounts and furnishes the doctors with an account distribution report showing how many patients were seen by them in a month, what kind of procedures were performed and what the charges were for each service. Patient history records are also kept on file and include billing accounts, office visits, dates, amounts of surgery and diagnoses.

Foster, who had no prior training in computers, said that she really enjoys working with the system and is now writing her own program for sending out rent notices to the tenants of the building owned by the medical group.

The system has worked out very well and has caused few problems, she noted. The microcomputer was run in conjunction with the service bureau for two months to ensure accuracy, and it went smoothly from the beginning, she recalled.

Northwest Surgical Associates next plans to purchase a word processor to handle daily paperwork.

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GTE Says Telenet Buy Needed to Survive

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The proposed acquisition of Telenet Corp. and its common carrier subsidiary by General Telephone and Electronics Corp. (GTE) will not threaten the competitiveness of the U.S. telecommunications market — and in fact is the only way both companies can remain competitive in that field, according to GTE.

In a recent filing, GTE told the Federal Communications Commission (FCC) that GTE's common carrier subsidiaries are too geographically limited and Telenet Corp.'s subsidiary, Telenet Communications Corp., is too hampered by lack of investment capital "to compete effectively in the data communications marketplace."

The GTE filing was in response to a 4-3 decision by the FCC that the proposed $60 million acquisition be investigated for possible anticompetitive impact on the U.S. communications market. The commission said it is particularly concerned about the business relationship of GTE and AT&T, whose proposed Advanced Communications Service (ACS) is a potential competitor of the Telenet service.

GTE receives approximately $1.6 billion of its $4 billion annual revenues from long distance telephone settlements from AT&T. In addition, the two telephone companies participate in a joint domestic satellite communications venture called Comstar.

The commission said it is concerned about "how GTE would assure that it would compete with AT&T rather than reach an accommodation for the joint provision of data communications" after Telenet is acquired. The commission therefore directed GTE and Telenet to submit a Section 214 application "fully documenting that the public interest is served by the proposed transaction."

Section 214 of the Communications Act rquires an FCC ruling that public convenience and necessity would be served before a carrier can acquire, operate or extend lines.

Jurisdiction Not Conceded

In its response to the FCC, dated Feb. 16, GTE said it did not concede that the FCC has jurisdiction over the acquisition or that any prior commission authorization is required under Section 214. The company has argued that its proposed acquisition of Telenet does not require FCC approval because neither of the two firms, as holding companies, is a carrier subject to the commission's regulation.

The FCC countered that it "must look to the underlying realities of the transaction at issue and not simply at its legal form. The test is the public convenience and necessity."

The commission called GTE's arguments "corporate fictions." The reality, according to the FCC, is that GTE — through its regional subsidiaries — is the second largest telephone system in the country. As owner of Telenet Corp., it would have ultimate

(Continued on Page 67)

AEA Busy Working to Squelch Extension of Renegotiation Board

By Marcia Blumenthal
CW Staff

PALO ALTO, Calif. — The American Electronics Association (AEA) is gethering grass roots support from its 1,200 members to squash a last-ditch effort to revive the Renegotiation Board, which is slated to expire March 31.

The Renegotiation Board was established in 1943 to review certain government contracts and assure that excess profits were not made by vendors selling to the public sector. The board has been revitalized by legislation 13 times since its founding.

Hoping to change the unlucky fate of the controversial board, Rep Joseph Minish (D-N.J.) filed H.R. 2002 on Feb. 8. Now before the house Banking Committee, the bill asks for a two-year extension of the board and for appropriations to fund it.

The AEA is opposed to the board on ideological grounds. The board's very existence "assumes that electronics firms (and other firms) are defrauding the government," according to Kenneth C.O. Hagerty, AEA's vice-president of government operations.

"The board is not needed because of the layers of safeguards written into the General Services Administration's procurement regulations," Hagerty pointed out. "If it is not possible to stop a board that is counterproductive, then this would discourage regulatory reform groups in Congress."

Minish, in a letter to President Carter soliciting support for his bill, said "it would be dead wrong to kill an agency which annually returns to the U.S. Treasury many times its annual expenditures."

However, estimates compiled by Rep. Peter McCloskey (R-Calif.) contradict this claim. McCloskey's figures indicate that for the past five years, the rene-

(Continued on Page 66)

For Fraud Against Vendor, Louisiana

Former Honeywell Execs Indicted

By Marcy Rosenberg
CW Staff

BATON ROUGE, La. — A federal grand jury here has indicted a pair of former Honeywell, Inc. marketing executives in Atlanta on charges of perpetrating a $522,555 fraud against the computer company and the state of Louisiana.

The 20-count indictment accuses William Kenneth Thatcher, former regional marketing director for Honeywell in Atlanta, and Robert L. Grapp, Thatcher's assistant at the time, with illegal racketeering, mail and wire fraud and perjury.

Thatcher and Grapp allegedly conducted a pattern of racketeering activity that included 43 overt acts to fraudulently obtain a $522,555 discount on $6.6 million worth of computer equipment the state ordered from Honeywell, according to Don Beckner, U.S. attorney.

Leasing Scheme

According to the indictments, Honeywell offered to sell the Louisiana State Division of Administration the computer equipment at an 8% discount. State law did not allow the division to make such large purchases of equipment without Louisiana legislative approval, Beckner said.

However, the Division of Administration had the authority to lease equipment of that value and decided to do so through Public Systems, Inc. (PSI), a computer leasing company formed by Grapp on July 7, 1973, about a month before he resigned from Honeywell.

While Grapp was said to have split equal ownership of PSI with Richard B. Robertson, vice-president of Houston-based Bovay Engineers, and Edward Malo, a former vice-president of La Salle National Bank in Chicago, the indictment claimed Malo was actually holding 80% of his shares secretly for Thatcher, then at Honeywell in Atlanta.

The indictments alleged that in June 1973, Thatcher and Grapp met with Charles E. Roemer II, Commissioner of Administration, to discuss the formation of PSI and that on July 10, Grapp and Roemer signed the prime contractor pact by which PSI was to supply computer services and hardware to the state of Louisiana.

Thatcher was "Honeywell's man handling the transaction and convinced his superiors at Honeywell to sell the equipment to PSI to lease to the state," Beckner said. "Thatcher dealt with PSI not only as an employee of Honeywell, but also as an undisclosed owner in the leasing com-

(Continued on Page 67)

Boothe Changes Leasing Tack

SAN FRANCISCO — Boothe Financial Corp. will not make further significant investments in computer equipment for its leased equipment portfolio. Instead, the company will focus its attention on general equipment leasing of transportation-related equipment and petroleum and fossil fuel drilling and recovery units.

Until the beginning of this year, nearly 100% of the firm's revenues were derived from sales and leases of computer equipment.

Although unwilling to elaborate on the details of the decision, Boothe Treasurer Robert Sharp conceded the switch in emphasis was in part a response to IBM's recent aggressive marketing moves.

An industry source noted that Boothe is heavily committed to IBM 370 equipment. He speculated that price slashing in the 370 marketplace following IBM's 4300 announcement convinced the company to change its tack.

Boothe is currently in a highly liquid, position having gained $19.7 million from the sale of its Courier Terminal Systems subsidiary to ITT last March, Sharp said. Since the beginning of this year, Boothe has committed about $14.5 million to the acquisition of aircraft support equipment, covered hopper railroad cars and other equipment with a long physical life. However, Boothe expects to generate substantial revenue from its current computer lease portfolio. As of Sept. 30, computer equipment on Boothe's books, less accumulated depreciation, was valued at $6.2 million. Purchases of

(Continued on Page 64)

Harris Enters Semiconductor Venture in France

MELBOURNE, Fla. — Harris Corp. and Matra S.A. of Paris have agreed in principle to form a joint venture company to produce CMOS integrated circuits.

Under the terms of the proposed agreement, the French government and Matra will put up virtually all of the $40 million for the joint venture and will control 51% of the new company, Harris reported.

In return for a 49% ownership, Harris will provide the process technology and licenses necessary to produce its CMOS chips.

Matra is a diversified producer of space, automotive and telecommunications equipment.

In embarking on the venture, Harris joined several other U.S. firms that have entered into agreements with the French government and private industry there. Like the UK, France is committed to attracting integrated circuit makers to develop a home-grown industry and provide jobs for its citizens.

National Semi Venture

Last December, National Semiconductor Corp. reached a tentative agreement with the French government and Saint-Gobain-Pont-a-Mousson to produce MOS integrated circuits. The initial investment will be about $17 million, National Semi said, but it declined to elaborate on whether the company will be putting up any of the funding.

That operation, 49% owned by National Semi, is expected to begin by the end of 1980. Saint-Gobain is searching for an appropriate site for the facility.

An investment of about $120 million will be made in the venture during the next five years, National Semi said.

Last November, Motorola, Inc.'s Semiconductor Group concluded a joint venture agreement with Thomson/Sescosm and Efcis. Motorola would not reveal the amount of its investment in the venture, but French sources earlier reported the venture would probably receive an $80 million government subsidy.

CSC Totally Out of Iran, Starts Fund to Cover Loss

EL SEGUNDO, Calif. — Computer Sciences Corp. (CSC) has safely withdrawn its remaining employees from Iran without resorting to command tactics. The company's employees have been leaving sporadically during the past few weeks.

CSC had been developing automated logistics systems and management information systems for the Iranian defense forces.

To cover losses on its Iranian operation, CSC has established a reserve of $1.9 million. This will be charged to net earnings during the fourth quarter, which will end March 30. The loss will reduce that quarter's earnings by about 15 cents per share, the company reported.

William R. Hoover, president and chairman of CSC, anticipates a profitable fourth quarter despite this earnings setback. He said the company's withdrawal from Iran will have an "inconsequential effect" on ongoing revenues and profits.

Activities in that country had declined to a relatively low level of effort in recent years as major portions of CSC's projects were completed, Hoover said.

Boothe Changes Leasing Tack

(Continued from Page 63)

the original equipment totaled $89.2 million, Sharp reported.

Although withdrawing from future investment in computer equipment for leasing purposes, Boothe will pursue the secondary computer equipment market. To increase its capability in the used equipment sector, Boothe and Forsythe McArthur Associates, Inc., a Chicago-based computer brokerage firm, have agreed in principle to merge.

Richard Forsythe, president of Forsythe McArthur, cited Boothe's equity position and broad customer base as a reason for his firm's interest in merging with Boothe.

In its last fiscal year, ended Dec. 30, Boothe's revenues totaled $21.9 million; earnings were $6.2 million or $2.67 per share. In 1977 the firm's revenues were $19.5 million and earnings totaled $4.8 million or $1.37 per share.

Revenue from leased equipment for 1978 totaled $10.6 million, down from $13.9 million in the prior year.

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DCL May Liquidate

ENGLEWOOD, N.J. — DCL, Inc. has "definitely" rejected Greyhound Computer Corp.'s revised merger offer of $4.50 a share and instead may liquidate.

DCL shareholders could stand to make more than $4.50 a share if the firm decides to liquidate, according to DCL President James P. Hassett, who expects that decision to be made "in the next eight weeks or so."

Five months ago, DCL agreed to merge with Greyhound for $5 a share, or $20 million. Following IBM's 4300 announcement, Greyhound withdrew its offer and lowered its bid by $2 million to $4.50 a share [CW, Feb. 19].

This latest offer "was not deemed adequate," Daniel Bertram, DCL's vice-president, secretary and treasurer, stated. Bertram had no comment about the possible liquidation move except to say that the implications for DCL's 45 employees were obvious.

"If the decision is made to liquidate, which means there is no more company, how can you employ people?" he asked tersely.

Bertram also declined to discuss the alternatives his firm is considering in addition to liquidation and refused to comment when asked if DCL had received other merger offers.

A spokesman for Greyhound said the firm would not make DCL a new offer.

Itel Revamps Organization To Emphasize Peripherals

SAN FRANCISCO — In a move designed to place equal marketing emphasis on both its peripherals and computer systems product lines, Itel Corp. has restructured its Computer Products Division, forming two new operating divisions.

The Computer Products Division has been split into the Computer Systems Division and the Computer Peripherals Division. However, peripheral sales relating to the company's Advanced Systems customers will still be made through the Computer Systems Division.

The formation of the Computer Peripherals Division will give Itel an increased opportunity to penetrate the expanding peripherals market for both stand-alone items and IBM add-ons, the firm noted.

"This division represents Itel's commitment to acquire new products and market them to rapidly developing segments within our industry, including microprocessing and data communications," John H. Clark, president of Itel's Data Products Group, stated.

T. Kendall Hunt, formerly president of Itel's Computer Products Division, has been named president of the Computer Systems Division. Steven R. Gerbsman, formerly head of the firm's Business Systems Division, has been appointed president of the Computer Peripherals Division.

AEA Working To Squash Board

(Continued from Page 63)

gotiation process has cost taxpayers $20 to $25 for every dollar the board has recovered.

The House Banking Committee is responsible for authorizing the extension of the board. If the authorization is approved, the bill will then be heard by the House Appropriations Committee, which determines funding for the board.

Both committees as well as the corresponding Senate committees must rule in favor of Minish's bill. If the bill is passed, the board will receive $1.1 million to see it through fiscal 1979 and an additional $7.4 million through 1980.

Michael M. Larkin, chairman of AEA's procurement committee, recalled that proponents of the board were rebuffed three times last year when they attempted to press for continued authorization and appropriations for the board.

Last January, the Renegotiation Board ruled that IBM realized about $41 million in excess profits from doing business with the federal government in 1969 and 1970 [CW, Jan. 29]. The timing of that ruling was interpreted by industry representatives as a grandstand play by the board to stave off its imminent demise.

The board denied the allegation, stating it had been having trouble getting information from IBM.

The AEA has about 1,200 members in 154 congressional districts. Hagerty, is hoping that an "action alert" recently sent to its members will spur them to pressure their congressmen to squelch the bill.

However, because of the support of the Democratic leadership in the House, it is possible that Minish's bill may pass, Hagerty warned.

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Dataproducts, Dick Sign Printer Research Pact

WOODLAND HILLS, Calif. — Dataproducts Corp. and A.B. Dick Co. have entered into an agreement for cooperative research in nonimpact ink-jet printing.

Dataproducts President Graham Tyson said there is a strong possibility ink-jet printers will be an important force in the foture, particularly in high-quality word processing.

"We invest nearly $10 million annually in continuing research on major printing techniques such as ink-jet, thermal and electrophotographic nonimpact technologies," Tyson said. "The ink-jet research conducted under the joint agreement is not directed toward specific products; rather, it is intended to advance the state of the art for future use.

"No ink-jet printer yet offered in the marketplace fully exploits the flexibility which this technology has to offer," he pointed out.

The agreement does not involve any financial exchange. The research will be conducted at Dataproducts' facility in Santa Clara, Calif., and at A.B. Dick's Information Products Division in Elk Grove Village, Ill.

With ink-jet technology, printed characters are formed on a surface by propelling minute ink droplets through the air at very high speeds.

GTE Defends Telenet Buy

(Continued from Page 63)

control of that company's communications subsidiary.

GTE replied by noting that, as a regulated communications carrier, Telenet's packet-switching network cannot be altered without FCC approval. The proposed acquisition therefore does not present any threat to a competitive telecommunications market.

In fact, GTE said, neither GTE nor Telenet will be able to remain competitive if the acquisition does not go through. "GTE's common carrier subsidiaries are presently limited by territorial franchises," the company said. "They can only provide communications services in a relatively small geographic area to a small percentage of this country's population and businesses.

"Through Telenet, GTE can make its resources and communications skills available to users throughout the U.S. In this way, GTE will compete on a nationwide basis for the first time. The acquisition of Telenet will permit competition by a GTE subsidiary in the offering of data communications services in areas historically served by the Bell System."

Telenet's management believes the company "cannot participate as an effective competitive force" without "substantial infusions of capital," GTE continued. Telenet cannot raise the required capital through further debt or public equity financing, according to GTE, which added that "within the limited time frame available to Telenet at present, GTE offers the only realistic option: acquisition.

Furthermore, "since Telenet currently accounts for only a minor fraction of 1% of the data communications market in the U.S., its acquisition by GTE cannot have any significant anticompetitive consequences."

Honeywell Execs Charged

(Continued from Page 63)

pany."

PSI obtained financing for the deal with Honeywell through a New York funding agency, Smith & Barney Investment Bankers, Inc., which became the lessor in the transaction, Beckner said. Since Honeywell "received a lump sum in cash payment for all equipment from PSI, the computer vendor gave the $522,555 discount to PSI," he explained.

"PSI made money, Smith & Barney made money and the state of Louisiana has the continuing obligation to make monthly payments to Smith & Barney on the computer lease for a number of systems installed at state facilities such as Charity Hospital in New Orleans and the Department of Education in Baton Rouge," the U.S. attorney added.

Honeywell Cooperative

In addition, the indictment alleged that both men conspired "with other persons both known and unknown to the grand jury" to participate in unlawful racketeering activities. Beckner declined to name the "known" persons.

He did state, however, that there is "no evidence of involvement by anyone else at Honeywell" and that the firm cooperated fully during the grand jury investigation which began last May.

In the fall, "we sent the Assistant district attorney and [a Federal Bureau of Investigation] agent to Honeywell in Atlanta for a week to interview scores of employees. Honeywell completely opened its files to us in this case," Beckner said.

Howard Sinor, an attorney with Jones & Walker in New Orleans representing Honeywell, said his client "has no comment on the case."

A Honeywell spokesman, however, noted that Thatcher currently is "on leave of absence" from his position as director of marketing operations for the firm's Marketing and Services Information Systems Division (MSISD) in Phoenix. Thatcher took the leave about three weeks ago "because he has a legal matter he wishes to clear up," the spokesman said.

William McCain, who reported to Thatcher as director of marketing programs and support operations, has been named interim director of marketing operations.

Thatcher's attorney, Jordan Green in Phoenix, said his client pleaded not guilty to the federal charges, but refused further comment on the case.

Similarly, Grapp has entered a plea of not guilty "unequivocally," according to his attorney, Lewis Unglesby, a trial lawyer in Baton Rouge. About the government charges against his client, Unglesby said, "They are wrong. There has been no illegality."

Thatcher and Grapp are scheduled to stand trial as co-defendants on June 4 in the U.S. District Court for the Middle District of Louisiana here. If convicted, Thatcher could face up to $132,000 in fines, 120 years in federal prison or both. Grapp's maximum potential sentence amounts to a fine of $122,000, 115 years in jail or both.

A new grand jury has been empaneled to complete a second phase of the investigation to look into the state of Louisiana's involvement in the computer deals.

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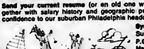

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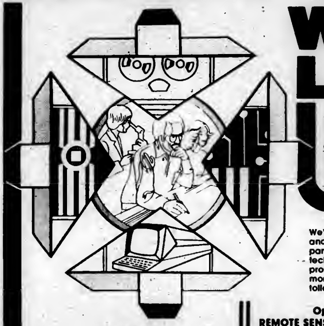

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- OPPORTUNITIES ALSO EXIST FOR individuals with experience in maintaining IMS/VS on the IBM 370/168 under MVS. Keeping current with new developments while maintaining a stable system for production support is our primary challenge

Opportunities In Oakridge, Tennessee

REMOTE SENSING

Senior level individuals familiar with all aspects of remote sensing which includes Geographic Data bases, digital image processing and software, photogrammetrics, photo interpretation, hardware operational characteristics and processing and software development. Prior experience associated with surface mining applications is preferable.

DATA MANAGEMENT

Using Tektronix Digitizing System and Video Projector System develop Data Bases on Digitizing station, and provide editing software on the screen or the projector using FORTRAN on MODCOMP Computer Will build direct access storage/retrieval system on MODCOMP to manage Data Bases Will also work on IBM 360 Computer using FORTRAN

SCIENTIFIC PROGRAMMING

Evaluate, analyze, and modify energy, environmental, and economic computer models, develop FORTRAN programs for data base processing and plotting on a variety of graphics devices Requires three to five years of Scientific Programming and Systems Analysis using FORTRAN and Assembly Languages Good understanding of IBM 360 system HASP is desirable

MINI/MICRO COMPUTER SYSTEMS

Systems analysis and software development on MODCOMP, PDP 10, TERAC and LSI-11 Computer with application to color image processing Develop software for VIDICON Scanning Camera to digitize maps, color animation with vector to raster conversion FORTRAN and assembly language required Knowledge of IBM 360 HASP is useful

SYSTEMS DESIGN

Planning, organizing, and engineering of digital image processing systems capable of supporting computations and digital manipulation of satellite imagery Must understand hardware specifications and associated digital interfaces Requires familiarity with hardware such as plotters, mini computers, microprocessors, video equipment, video recorders, video scanning cameras and digitalizing tablets. Good knowledge of FORTRAN and assembly Language programming on minicomputer (PDP 10, MODCOMP) and IBM 360 is essential.

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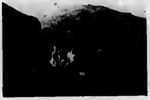

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Please send your resume in confidence to:

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The individual we are seeking for this position has excellent technical, management and interpersonal skills; is a self starter and an "educator" with the right mix of aptitude and attitude towards the profession (an individual who can work with people to get the job done). This key position requires good oral and written skills, 4-6 years of technical and 2-3 years of supervisory/managerial experience. Specifically, the candidate should be able to provide planning and direction for a Technical Support group of 7 to 9; this position reports to the Director, Corporate Systems and Data Processing. Group responsibilities include ongoing development and support of the 370/148 environment with OS/VS1, TONE, CICS and a nationwide network of intelligent programmable terminals. Particular expertise in the following areas is desirable: operating software internals, systems performance analysis, hardware and software analysis, data based and interactive application systems software, teleprocessing and distributed processing, technical standards and quality control. The individual should be degreed in computer science or other related field.

Manager, Data Processing Operations

We require a self-starter, who is a mature, decisive individual with sound management and interpersonal skills who is able to grasp situations quickly and has good oral and written skills. A stable experience profile which includes at least 3-5 years of management background in one or more of the data processing disciplines, a bachelors degree in business, computer science or related field and medium to large scale IBM 370 equipment and application processing expertise are desirable.

The individual we seek will be responsible for managing our 3-shift data center facility, the production coordination group and all operational analysis functions; this will include planning, organizing and controlling all data center, network communications utilization, tape and DASD management, facility security, back-up recovery, and will train the staff in new improved methods and procedures necessary to obtain high production efficiency. This position reports to the Director, Corporate Systems and Data Processing.

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The successful candidates should have 4-6 years experience in all facets of systems development with emphasis on business analysis, systems design and systems analysis of business systems applications in the financial, administrative, production, sales, purchasing and order processing areas. Individuals should be knowledgeable of top-down systems design structure, be user oriented, conform to standard development methodology and have data based applications experience, with a BA or MBA degree desirable. Candidates should also have prior experience in COBOL programming.

Communications Programmer/Analyst

The individual(s) we seek have prior experience with IBM 370 and OS/VS1. They will have the responsibility to develop, program, modify and support all remote intelligent terminal application systems and data communications software. Knowledge of Sycor or comparable intelligent terminal and distributive data processing technology is highly desirable; 2-3 years of COBOL experience with assembler language and data communications experience helpful.

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Bachelors degree is required as well as 2-4 years experience in ANS COBOL, structured coding and standard development methodology is essential. Also required is a familiarity with IBM 370 series equipment with knowledge of OS/VS1 and job control language, business applications, i.e., financial, administrative, sales, production, purchasing and order processing background is desirable; CICS, data base knowledge and exposure to TONE (TSO) interactive programming is a plus. Qualified professionals will be assigned to project teams and work on new application projects, version changes and support existing applications.

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Who are your customers?

Well, this may sound a little like bragging, but it is really a point of great pride that I can say that L&N has 444 of the top 500 industrial companies in the country as clients. But what's equally important, is that our markets themselves are vast and continually growing; especially in power utilities, heavy industry, and chemicals.

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Here I have to come back to my first answer. We are a disciplined company, so you will be joining a team with a specific goal. On the job you'll learn a lot from the senior members on that team and also interface with other professionals in engineering, hardware, software, and applications. You'll be exposed to high, state-of-the-art technology—as a matter of fact, you'll be surrounded by it. But again, I don't want to kid you, the job will be tough, disciplined, and challenging. But important rewards and opportunities go with it.

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Requires expert ability in ANS COBOL. Knowledge of RPG II and Basic Assembler Programming languages and DOS preferred.

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Required for this position are an advanced degree in library science from an accredited library school, or equivalent, and a minimum of 2 years experience. You must have complete knowledge of computer industry technology and programming in FORTRAN IV and/or assembly language. Knowledge of Digital's PDP-11 series is highly desirable.

If you are interested and qualified, please forward resume including salary history to Theresa Buckley, Digital Equipment Corporation, Dept. A305 3807, 146 Main Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

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PROGRAMMER/ANALYSTS

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Background should include: VM, OS/VS1, CICS, JES, RES, and JCL. Data communications and teleprocessing networks experience is highly desirable. This is a definite growth position.

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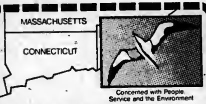

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APPLICATION PROGRAMMERS

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Please send resume with salary history, in confidence, to Ken U. Hopkins, Sr. Personnel Representative, SRI INTERNATIONAL, 333 Ravenswood Ave., Menlo Park, CA 94025. (415) 326-6200, Ext. 4875. An equal opportunity employer.

SRI International

Computer Control Systems

WED Enterprises, The Design Engineering and Development subsidiary of Walt Disney Productions is currently seeking innovative and technically skilled individuals for staffing requirements in all its engineering and engineering support departments. Some of our current openings include:

REAL TIME PROGRAMMERS

In the areas of system applications we are seeking individuals to expand the department responsible for Real Time Data Acquisition and Control Systems for Disneyland and Walt Disney World.

Candidates must possess a technical degree with 2-3 years hands-on experience utilizing assembly language on mini-computer systems; Data General experience very desirable.

DIGITAL SYSTEMS DESIGN ENGINEERS

Position involves evaluation of existing computer based animation systems. Responsibilities to include Design Analysis, recommendation of proposed system modifications and implementation of selected hardware designs.

Candidates must possess BSEE degree with emphasis on Logic and Circuit Design, 5 years experience in Real Time Hardware Design and Minicomputer Interfacing.

Experienced candidates, interested in career opportunity should submit resume indicating area of specialization and salary requirements to.

WED Enterprises - (JW10BCW)
Professional Staffing EPCOT
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DATA BASE ANALYST
SYSTEMS ANALYSTS
PROGRAMMER/ANALYSTS

We are one of the fastest growing department store chains serving the Southwestern United States.

You'll find challenging and outstanding growth potential in a dynamic state-of-the-art shop. We are currently using a 370-159 AP, OS/MVS, CICS/DL1 with a 3033 on order. This system supports a growing distributed network of IBM 3651 store controllers.
Our rapid growth requires superior professionals in the positions of:

DATA BASE ANALYST
Minimum five years in data processing with two years data base design experience, preferably with IMS/DB and its associated support products.
Strong skills in written and verbal communications and ability to interface with management and users.

SYSTEMS ANALYST
Minimum two years experience designing and implementing large scale on-line/DB systems.

PROGRAMMER/ANALYST
Minimum two years experience programming using COBOL or assembler on a large scale system.

IF you are qualified for any of the above positions please send your resume and current salary requirements to:

Ms. Lynne Caldwell
Dillard Department Stores, Inc.
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SYSTEM SOFTWARE DEVELOPMENT AT ADR . . .

System software development at ADR is not system programming. You won't apply endless PTFs, move data sets around, write exit routines or the sixteenth version of the charge-back report.

If you are tired of being a caretaker and want the challenge of being a software developer, we want to talk to you.

ADR is the #1 software products company in the world. We are large enough to be stable and respected, small enough to be informal - with room for personal recognition and professional advancement. Our attractive Princeton, N.J., location offers a quiet rural environment within easy reach of both New York City and Philadelphia.

We are currently embarking on several new projects to develop the software systems of the 1980s. The result is an immediate need for a variety of talented data processing professionals from support specialists to senior system analysts. Call us collect in Princeton at 609/921-8550 if you have experience in any of the following areas:

- **Assembly language and OS**
  Work on ROSCOE, our online program development system for OS. Work is in progress or planned in 1) secure operating environments, 2) problem-solving, interactive languages, 3) enhanced man/machine interface, 4) distributed processing. Requires several years of Assembly language experience. Call Alan Polk.
- **DOS/VS software development**
  Assist in the design and implementation of performance measurement tools for DOS/VS. Requires Assembly language and knowledge of DOS/VS internals. Familiarity with performance measurement helpful. Minimum two year's experience and/or college degree preferred. Call Philip J. Berg.
- **Online systems and display terminals**
  Assist in the design and implementation of an online program development/generation system. Requires familiarity with commercial applications, data base concepts and language processors (compilers, interpreters, and query languages). Programming experience with display terminals and/or a CS degree preferred. Call Adam Rin.
- **Assembly language, MVS and VSAM**
  Assist in the design and implementation of a source management system for online and batch access. Requires several years of Assembly language experience and familiarity with VSAM and MVS internals. Knowledge of data base concepts and/or a CS degree preferred. Call Ralph V. J. Lanoi.

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We are also looking for talented people to fill a variety of support and documentation positions. Please call Ed Smith, Personnel Director, for more information on any of these openings.

Technical Support Specialists to work on:

- **MetaCOBOL**
  Train new customers in the use of our generalized pre-compiler for COBOL applications development and maintenance. Provide telephone and on-site technical support. Requires experience with COBOL programming and commercial business applications. Experience with structured programming methods, data base applications and Assembly language preferred. Good communication skills essential. Traveling required.
- **The LIBRARIAN/Online**
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- **LOOK**
  Aid customers and ADR field representatives in the use of our performance measurement product line. Good communication skills essential. Some familiarity with OS and/or DOS internals highly desirable. Light travel.

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Present the MetaCOBOL Product Group to new prospects. Requires COBOL programming and commercial applications experience. Good communication skills essential. Traveling required.

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We have openings at all levels for writers and editors to research and write both internal and end-user documentation. Requires English or Journalism degree and/or previous technical writing or data processing experience. COBOL programming experience preferred.

Call ADR collect at 609/921-8550 or send your resume to:
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JAMES MADISON UNIVERSITY

SYSTEMS ANALYST A

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SAUDI ARABIA

DATA PROCESSING OPPORTUNITIES

SYSOREX INTERNATIONAL INC., a rapidly growing Systems Management Company, now developing innovative multitechnology systems in Saudi Arabia, seeks experienced Data Processing Professionals for the following positions.

SENIOR SYSTEMS ANALYSTS

You should have at least 5 years experience in analysis and design of business TP applications. Must be knowledgeable in COBOL and IBM TP systems, preferably CICS and 3270 Terminals. Should be capable of leading large projects.

PROGRAMMER ANALYSTS

You will be involved in applications design and programming in a TP environment on IBM 370 OS Systems. Positions require minimum 4 years experience, fluency in COBOL and Assembler, and knowledge of IBM CICS and 3270 Terminals.

APPLICATIONS PROGRAMMERS

Minimum 3 years experience in applications programming on IBM TP systems. Must be fluent in COBOL. Knowledge of CICS, ALC, 3270 terminals desirable. Degree essential

OPERATIONS INSTRUCTOR

You will be responsible for training Arabian personnel in computer operations. Must be completely familiar with IBM computer operations and possess instructor skills.

SYSOREX offers salaries commensurate with experience and a comprehensive benefits program which includes 30 day annual vacations with paid round trip transportation for employee & family to place of residence, 15 paid Holidays, free furnished family housing and free education of children.

Please send resume, including salary history, to Director of Personnel, SYSOREX INTERNATIONAL INC., 10590 N. Tantau Ave., Cupertino, CA 95014.

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SYSTEMS ANALYST to $24,000. Blue Chip industry leader in suburban MO seeks analyst for large scale systems dvlpmt in personnel & financial areas. Refer DM.

PROGRAMMER ANALYST to $20,000. Charlotte, NC, major expansion. Most respected & technically sophisticated shop in city seeks several Programmer/Analysts w/min 1 year COBOL, IBM, OS or DOS exp for variety of business applications & systems. Full benefits, outstanding career growth. Refer JS.

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ATLANTA, GA 30346 — B. Spang, 47 Perimeter Ctr., 404/393-0933
BALTIMORE, MD 21204 — B. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28202 — J. Schwab, 1742 Southern Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Rd., 216/749-6030
FORT LEE, NJ 07024 — R. Mansfield, 2125 Center Ave., 201/947-6920
McLEAN, VA 22101 — D. Miller, 7623 Jones Branch Dr., 703/790-1335
NEW YORK, NY 10036 — W. McKechnie, 1211 Ave. of the Americas, 212/840-6930
PITTSBURGH, PA 15222 — J. Beck, 4 Gateway Ctr., 412/232-0410
PRINCETON, NJ 08540 — R. Davis, 3490 U.S. Rte. 1, 609/452-8135
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We seek a person experienced in IMS/VS internals and performance tuning, and IMS System Generation and Maintenance for one manufacturing division. This is a state-of-the-art activity running IMS/VS 1.1.4 on a 6-meg IBM 370/158-AP with MVS, JES2 and TSO.

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Enjoy a comprehensive benefit package, including Company-paid retirement program and life, health and dental insurance

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IBM DOS/VS installation seeking ambitious individuals with computer science background and/or past programming experience to work in a bank service environment. We offer an opportunity to become involved in major application software development in a CICS/VS setting. This undertaking would provide excellent growth potential particularly for the person desiring to grow toward a future systems analyst position. In addition to attractive salary and benefit programs, we offer pleasant professional surroundings and the opportunity to be associated with the latest in IBM hardware and software systems. Please contact

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Computational Specialist

The School of Aeronautics and Astronautics, Purdue University, is seeking applicants for a position in application of the computer to aerospace engineering education and research. The individual would teach the Computer Application course, manage our computer facilities and counsel and assist in the computational aspects of research. A Ph.D. is not required. Engineering background is highly desirable. The appointment would be non-tenure track, and salary will be commensurate with qualifications and experience. Interested persons should write to Professor B.A. Reese, Head, School of Aeronautics and Astronautics, Purdue University, W. Lafayette, IN 47907 and include a complete vita and names and addresses of three references. Initial screening will begin 1 February 1979 and continue until the position is filled. Purdue Univ. is an equal opportunity/affirmative action employer.

SAN FRANCISCO DP TRAINER POSITIONS

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In—house programming instructors needed for the following areas: COBOL, OS-370, ALC, STRUCTURED PROGRAMMING, DESIGN AND ANALYSIS.
Salary commensurate with experience. Send resume to:

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DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS (MIS)

The Director reports to the President and is responsible for the design, development, coordination, general supervision, evaluation and control of the systems, programming and data operations of the college. The Director will be responsible for insuring the security of the data base and the physical security of the on-site PDP 11/70, Honeywell Level 62 and numerous terminals and peripheral equipment.

The Director will also work closely with the various academic divisions that utilize the data processing hardware and software for instructional purposes.

QUALIFICATIONS

A minimum of a Baccalaureate Degree in Data Processing or related area with strong background in systems analysis. A Master's Degree is preferred.

Experience and a proven record in managing an Educational MIS operation including computer operations and systems design and development.

A working knowledge of high level computer languages including BASIC, COBOL, FORTRAN, and RPG.

SALARY

Competitive. Entry level dependent on experience and background.

Send expressions of interests to:
Personnel Office, Cincinnati Technical College
3520 Central Parkway, Cincinnati, Ohio 45223

DEADLINE for submission of expressions of interest is March 15, 1979. No telephone inquiries, please.

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* HIRE BONUS	WANTED
$2,000	Sr. Programmer/Analyst 5-8 years experience. Systems development, COBOL, interactive design and analyst.
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** Bonus payable upon 12 months service*

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Salary is attractive, benefits liberal and comprehensive. Relocation will be well assisted to our very desirable South Florida area. Please send resume, with salary data, confidentially to Employment Manager.

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We offer excellent opportunity for personal and professional growth potential. Top salary and full benefit package (relocation expense included).

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These positions require either actual experience with data base design, gens, security, and recovery, or2 or more years experience in data base applications (IMS, TOTAL, IDMS, etc.) with the desire to become a data base administrator. Systems design and COBOL programming experience are necessary and some Assembly language programming is desirable. Familiarization with Information Systems Planning is helpful.

Please send resume or details of your background IMMEDIATELY to Thomas E. Leigh, Dept. CW35, ITT Federal Electric Corporation, Box 1886, Vandenberg AF Base, California 93437.

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SCI Systems, Inc., a young aggressive manufacturer of Terminal Systems, is looking for an experienced software designer to write operating systems for microprocessor based intelligent terminals.

Requirements include:

- **BSEE, BSCS or equivalent work experience.**
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If you meet the above requirements and want to know more about your growth potential at SCI, call collect 205-881-1611 and ask for Emil Ankermiller or send your resume to:

SCI

Emil Ankermiller
SCI SYSTEMS, INC.
P.O. Box 4000
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PROGRAMMER/ANALYST

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We have an excellent starting salary for those with demonstrated expertise; regular increases are based on individual merit. Our benefit package is second to none, and relocation costs are provided. If you think that individual effort is important, and want to work for a company that agrees with you, call or send your resume to Mr. Ed Lyons.

M.I.S. international, inc.

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Arizona State Univ.
IBM 370 System Support

Senior systems support analyst to work on IBM 3031 class machines, experience with VM/370, VS1, or MVS operating systems, SYSGENS and internals is desirable. Position requires 2 to 5 years DP experience and/or degree. Must be able to communicate effectively with management and technical personnel. Annual starting salary $17,570. Application period ends March 13, 1979. **Submit application to personnel Department, Arizona State University, Tempe, AZ 85281.** A criminal history record check is required of the successful applicant. Equal opportunity/affirmative action employer.

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Candidate will have 3-5 years programming background with extensive experience in COBOL, O/S, IMS, teleprocessing. Oegree preferred with a good working knowledge ol IBM 370 hardware essential. Some design axperience desirable

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Must be capable of designing and writing new applications in financial and production systems ereas. Will work closely with users in defining systams requirements.

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The pay is competitive and based on your ability. A full package of benefits including paid relocation, is included. You will also enjoy an excellent working anvironment.

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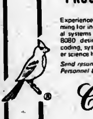
Send resume, transcript and salary requirements to Personnel Director.



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Programmer/Analyst

Team member in the design and implementation ol Structured COBOL CICS applications using your own CRT lor programming and testing. 2 to 5 years Business Applications Exposure utilizing ANS COBOL required.

Contact:
RONALD YON
Director EDP Recruitment
(513) 222-2525
or send resume to:
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Must be proficient in COBOL, Systems Analysis and Design. Excellent communication skills required. Degree in business, computer science or related field. Data Base, structured programming, data communications experience desired.

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To get the survey for any of the aforementioned areas, call 800-621-2184, toll free, Illinois residents call (312) 977-1555. Each office has a large copy of the complete national survey that you can examine by visiting the office nearest to you

National Computer Associates
Constantly Growing Stronger

COMPUTER PROFESSIONALS CINCINNATI, OHIO

The Filth Third Bancorp is expanding its remote data processing services which are currently offered to the financial community. Our telecommunications network currently drives over 200 terminals and remote job entry stations in a 250 mile radius of Cincinnati. If you are looking lor "ground floor" opportunities in a fast moving state-ol-the-art environment, career advancement, and professional growth, we may have a job for you in the following areas:

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We have openings for IBM 370 assembler language programmers in the development of on-line application systems, EFTS transaction processing, and DB/DC internals. Our on-line environment includes an ACF/VTAM telecommunications network which runs under OS/VS1 (soon MVS) and uses a complex VSAM relational data base.

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An Equal Opportunity Employer

SALES REPRESENTATIVE

DC, DALLAS, & ATLANTA TERRITORIES

Syntonic Technology, a division ol Control Data Corporation, has immediate naed for individuals who can develop naw market opportunities lor our third party minicomputers and peripharal maintenance services. The successful candidates will have 3 years axperience in the electronic maintenance field, skills in devising maintenence programs, and e basic familiarity with third party maintenence operations. Some service managemant axperience will be e plus.

If this describes you, we can offer e very competitive base salery, an excellent commission plan, full company benefits, and a dynamic work environment. For prompt, confidential consideration, send your resume and salary history to:

Mr. Dennis Young

SYNTONIC TECHNOLOGY

an electronics maintenance service of
CONTROL DATA CORPORATION

7150 Airport Highway
Pennsauken, NJ 08109

An Affirmative Action Employer M/F

Are you looking for an interesting job?

If you are interested in helping to solve some of America's most fascinating problems in the field of transportation, continue reading. Have you picked up a newspaper lately and seen stories about mid-air collisions? Rail shipments of hazardous materials? Airport noise restrictions? Auto and truck fuel economy? The gas guzzler tax? Problems with subway systems like the MBTA? When Kentron people read those articles, they are reading about projects to which they are contributing. When was the last time you wondered about the relevance of your job?

Kentron offers exciting work in a professional environment. You already know that experienced programmers and analysts are in heavy demand. Some of our own people noticed that and left for, what they thought were, greener pastures. Five of them came back within a year with a "lateral" in salary. Why? Because they prefer the type of work they were doing here at Kentron, as well as the professional atmosphere of a "research-like" environment.

Here at Kentron, you will be given the opportunity to do interesting work, at a competitive salary and with a liberal benefits package — if you qualify. The following requirements are real. If you don't meet them, don't apply. Conversely, if you do fit one of them, send us your resume. Kentron just might be able to get you to like your job again.

Scientific Applications Programmers and Analysts

Areas of expertise include, but are not restricted to, large and small scale simulation and modeling, statistical analysis, econometric modeling, data base design and/or implementation network and scheduling theory. Applicants should have a degree plus minimum of 3 years FORTRAN experience. Knowledge of 360/370 JCL and/or DECSYSTEM-10 extremely helpful.

Mini/Microcomputer Programmers and Analysts

You will work on challenging assignments using a variety of minicomputer or microcomputer systems. Applicants should have a degree in a technical field and a minimum of 4 years of FORTRAN or Assembly language programming experience.

Please send resume to: Department CW5

An equal opportunity employer

Kentron
International Inc
an LTV company

55 BROADWAY CAMBRIDGE MA 02142

DataCommunication Professionals

As the recognized leader and pacesetter in the manufacture of Modems and Multiplexers in the country, we have a need for additional dynamic professionals to help us continue our successful growth record. Presently, we seek the following qualified individuals:

District Sales Managers

The candidates we seek should possess at least 5 years sales experience (of which at least 2 years have been spent in a managerial position), preferably in the data communications industry. A thorough knowledge of data networks and the application of Modem and Multiplexing equipment. Will be responsible for own territory; handling direct sales to major accounts, supervising sales engineers; and managing distributors/manufacturers reps. Ideally, these individuals should currently be in a sales management position with a terminal manufacturer.

Sales Engineers

Should have a minimum of 2 years sales experience plus a thorough knowledge of data communication systems. The selected candidate will be assigned to a specific territory and will be responsible for the sale of modems, multiplexers and diagnostic systems to the end-user community.

Application Engineers

For these positions, we need individuals with some related experience. After assignments to a Regional Area, will provide support to District Managers and Sales Engineers. This involves technical assistance to sales personnel, preparation and presentation of field proposals and providing systems analysis to customers.

The successful candidates will find highly competitive
starting salaries based on background and qualifications
comprehensive company paid benefits and profit sharing
You will be based at a "key" US city location

Qualified candidates should send resume with salary history and requirements, indicating area of expertise, in confidence to:

Mr. Jack Sta, Personnel Manager

General DataComm Industries Inc.

One Kennedy Avenue
Danbury, Conn. 06810

An Equal Opportunity Employer Male/Female

PROGRAMMER ANALYST

The Chemicals Group of PPG Industries has an immediate need for experienced Programmer/Analysts at our Pittsburgh headquarters. You will be responsible for COBOL programming and basic analytical tasks on either our new 3032/3033 IBM hardware or our 370/115 chemical plant hardware. You will also be responsible for development of data base oriented systems, some of which entail teleprocessing technology.

If you have a bachelor's degree in Computer Science, Mathematics, Engineering, or business related field and at least two years' COBOL (ANSI) programming experience, this could prove to be the career opportunity you've been looking for. PPG offers an outstanding compensation package, including blue chip benefits and promotional opportunity.

Please send resume and salary history to: Andrew J. Minerchek, Professional Employment.

PPG INDUSTRIES, INC.
INDUSTRIES
One Gateway Center
Pittsburgh, PA 15222

AN EQUAL OPPORTUNITY EMPLOYER M/F

PROGRAMMER ANALYSTS

Dynamic, established organization in prime Florida Gold Coast location needs take-charge, innovative individuals to lead state-of-the-art application development projects in an engineering environment, using DEC's new VAX11/780. Applicants must have a proven track record in project leadership, ANS COBOL, MACRO-11, DEC timesharing, commercial and/or financial systems design, verbal and written communication skills. These challenging positions offer attractive salaries, relocation, full company benefits and upward mobility. Submit resume and salary history in confidence to:

CW BOX 1858
797 Washington Street
Newton, Mass. 02160

Pacific Northwest and Alaska

Seattle/Portland

Computer Performance Analyst	to 30K
Systems Programmer	to 30K
Project Manager	to 32K
Analyst Prog	to 28K

Alaska

Computer Operations Manager	to 45K
2 Soft Analysts	to 32K

EMPLOYER PAID FEES

For a confidential discussion for these and other positions contact:

Jim Morris

Houser, Martin, Morris & Assoc.
(206) 455-[illegible]
1021-114th S.E., Suite 318
Bellevue WA 98004

SOFTWARE OPPORTUNITIES

We're expanding our technical support staff at our Oak Brook headquarters. If you enjoy the challenges of a dynamic, state-of-the-art software house, you may have a rewarding future at Pansophic. If you have a good operating knowledge (OS/VS and DOS/VS Internals), JCL and one or more years BAL experience, you could be the person for one of our Product Support and Development positions.

PRODUCT SUPPORT FOR PANEXEC AND PANVALET

Do you understand the concept of a linkage editor and can you explain how it works to other DP professionals? Are your strong points communications and proven analytic ability? The Product Support staff provides technical assistance to our customers, our own field personnel and to various departments, and maintains quality control and test streams of the product.

SOFTWARE DEVELOPMENT

Can you do trouble shooting and updating of systems software? Do you look for the day when you can get into major systems development? Two new staff positions have been created in our Research and Development Center to provide ongoing support and followup maintenance of our software products.

These positions represent ideal growth vehicles for career minded software specialists seeking the creative latitude available in a highly professional Research and Development environment. We offer an excellent salary and benefits package, including company paid life, health and dental insurance, full tuition reimbursement and profit sharing. For prompt, confidential consideration, please send your resume or call Rich Mickey at 312 986 6025, PANSOPHIC SYSTEMS, INC., 709 Enterprise Drive, Oak Brook, IL 60521

PANSOPHIC

An Equal Opportunity Employer M/F

New opportunities for the hardware/software professionals

TAKE A HAND IN THE CHALLENGE OF EXPANDING OUR FACILITIES ... AND HEIGHTENING YOUR OWN FUTURE

Forward-looking expansion now under way on the part of this major electric utility can offer you a significant opportunity for the responsibilities you want.

ENGINEER/COMPUTER SPECIALIST

The candidate we seek will have both hardware and software capability. In this newly created position, you'll be responsible for design, installation, and start up of systems for all sizes of in-plant computers and peripheral equipment. Project duties will involve working with analog/digital sub-systems and will include support of systems modification and maintenance functions.

Technical degree a must, coupled with minimum 5 years experience in hardware and/or software design, plus exposure to real-time, computer-based data acquisition and control systems. Knowledge of systems as applied to monitoring and control of nuclear power plant processes desirable.

PROGRAMMER ANALYST/
Process Control

Will be responsible for various software-related duties from design through testing and maintenance, to programming for various plant computer software systems. Must also be able to correct existing program logic and modify programs to reflect new methodologies, and improve program efficiencies using real-time computer methods.

Technical degree required, preferably Math or Computer Science major, and 2-5 years experience in programming including proficiency in FORTRAN, Assembly and machine languages.

We offer competitive salaries, commensurate with experience and potential for growth, plus top benefits which include relocation assistance to our desirable North Jersey headquarters. For immediate consideration, in assured confidence, send resume with salary history and current requirement, to: DEPT. CW3059, ATTENTION: R. McCABE

JCP&L GPU

JERSEY CENTRAL POWER & LIGHT COMPANY
Madison Avenue at Punch Bowl Road,
Morristown, New Jersey 07960
MEMBER COMPANY OF THE GENERAL PUBLIC UTILITIES SYSTEM
In principle and practice — an equal opportunity employer M/F

SYSTEMS PROGRAMMER
RICHMOND, VIRGINIA

Experienced systems programmer to implement and maintain all systems software. Thorough knowledge of ALC and COBOL required with experience in implementing DOS/VS and CICS. 5 years or more EDP experience preferred.

PROGRAMMER ANALYST

Need programmer analyst with casualty insurance processing experience to develop, implement and maintain EDP systems. Knowledge of COBOL and ALC with 4 years or more experience preferred.

Environment is medium size shop in growing company. Implementing DOS/VS, CICS/VS, OMS/VS, POWER/VS, ON-LINE Programming and other software on IBM 370/145 1 meg system with 3350 disk. Will be utilizing PMS software package for insurance processing on local and remote video terminals.

Good benefit program. Salary to commensurate with experience and education. Some college preferred.

Send resume and salary history to:
Claude D. Busic

VIRGINIA FARM BUREAU
MUTUAL INSURANCE COMPANY
P.O. Box 27552, Richmond, VA 23261
or call 804-788-1234
an equal opportunity employer

Data Processing Manager

U.S. Forces newspaper, Stars and Stripes, 100,000 circulation daily, has an opening in Western Germany for an experienced Data Processing Manager. Candidate must have the following minimum qualifications: 6 years in Data Processing profession to include 2 years management and supervision, 2 years system analysis and 2 years programming in both COBOL and RPG II. Applicant must have worked with a cardless IBM S/3 disc system. College degree and extensive experience in financial computer applications highly desirable. Applications without the required minimum experience will not be considered. Full resume required with original application. Salary in-hire $23,087 P/A, plus living quarters allowance, overseas transportation and group insurance. Only applications postmarked on or before 14 March will be considered. Apply to Civilian Personnel Officer, European Stars and Stripes, APO New York 09175.

POSITIONS NATIONWIDE

CALL TOLL FREE
800-426-0342

REAL TIME PROGS. To 32K
International consulting firm needs 3-5 yrs. exp. with Fortran & PDP 11/70. Positions available in So. Calif. & East Coast.

EDP AUDITORS To 24K
Many openings from coast to coast.

COBOL PROGS. To 24K
Three yrs. experience OS/SCL, business systems. IMS exp. desireable.

SYSTEMS PROGS. To 30K
Three yrs. exp. in generation & support of MVT, SVS or MVS.

PROJECT PROGS. To 30K
B.S. in Eng. Sci. with real time process programming experience.

BILL ISGRIG
PARKER PAGE ASSOC.
P.O. Box 12306
Seattle, WA 98111
Offices in Wash., D.C.,
Chicago, Atlanta, Portland, Or.

PROGRAMMER ANALYST

needed for a 250 bed Hospital located on the Southwest coast of Florida. Previous experience in Hospitals or with the 6500 Burrough equipment is required. Good salary and benefits plus a pleasant working and living conditions. Send résume to: Venice Hospital, 540 The Rialto, Venice, Fla. 33595 or call collect for further information: 813 485-0942.

An Equal Opportunity Employer M/F.

PROGRAMMER ANALYST

Credit Union
Software Development

Anacomp, a leading processor of credit unions, is seeking aggressive individuals to form our development team. We need people with 3+ years experience preferably with credit union, or financial background. These individuals must possess systems design knowledge with a strong COBOL background. Duties will include participation in the design and implementation of a complete on-line real-time system on a Burroughs medium system. Send resume and salary requirements to:

John Shrall
Anacomp, Inc.
6004 Castleway Dr.
Indianapolis, IN 46250

SUNBELT

SYSTEMS ANALYST

To perform requirements evaluation, design systems, and develop functional specifications for computerized applications in local government. Mecklenburg County, the largest county in North Carolina, operates a 370-138 with DOS/VS, CICS, DL/1, VSAM and ETSS. Excellent working conditions and benefits. Send resume and salary requirements to Mecklenburg County Personnel Director, 720 East Fourth Street, Charlotte, North Carolina 28202.

Move Ahead With RAMIS II

RAMIS II is the most productive applications-development software available today. It is used extensively throughout the world, and our 50% annual growth rate continues to generate new openings for progressive individuals.

We need:

- **Marketing Representatives**
- **Sales Support Specialists**
- **Application Consultants**
- **Software Engineers**

Mathematica Products Group, a Subsidiary of Mathematica, Inc., a major consulting company in the management sciences, develops and markets the fastest growing software system in the industry — RAMIS II.

RAMIS II is the only software product to integrate a user-oriented, English-like nonprocedural language with a comprehensive DBMS.

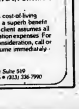
We are looking for self-motivated, aggressive individuals with excellent communication skills and degree or equivalent with proven track records in relevant areas. Openings in Princeton, Los Angeles and Chicago.

Competitive salary plus significant performance incentives and excellent benefits.

For prompt consideration and a local interview send resume with salary history in complete confidence to Dept. P 303.

MATHEMATICA PRODUCTS GROUP
P.O. Box 2392, Princeton, New Jersey 08540
equal opportunity/affirmative action employer m/f

Assignment: STAFF ONE OF THE MOST SOPHISTICATED DATA CENTERS IN AMERICA



By expanding their corporate data center,
our client, a Big 3 automaker,
has given us the green light to find the most
talented DP professionals in the nation.

- **PROGRAMMERS**
- **PROGRAMMER ANALYSTS**
- **SYSTEMS ANALYSTS**
- **SYSTEMS PROGRAMMERS**
- **DATA BASE ADMINISTRATORS**
- **OPERATIONS RESEARCH, ETC.**

Here's your chance to work with the finest equipment available: IBM 3033's, Honeywell 6080's, IBM 370/168, and a variety of minicomputers.

Their software includes, but is not limited to, COBOL, PL-1, FORTRAN, IMS, CICS, IDS and OS/VS-MVS.

Salaries range from $15,000 to $30,000 and over, plus cost-of-living allowance and a superb benefit package. Our client assumes all fees and relocation expenses. For confidential consideration, call or send your resume immediately.

The National Personnel System
Dunhill
OF DEARBORN, INC
Parklane Towers West Suite 519
Dearborn, Mich. 48126 • (313) 336-7990

DATA PROCESSING

New Orleans has the lifestyle you want ...

... and the career opportunities you deserve!

Our client, one of the leading financial institutions in the New Orleans, Louisiana area, has a number of challenging and rewarding new openings for career-minded individuals. Here, you have the perfect match of a lively company that is aiming toward the future and a renowned city that blends history, culture beauty and progressiveness. Theater, opera, music, and educational facilities share a welcome place here, not to mention professional sports. And the corporate atmosphere is perfectly in tune with our client's aggressive development. They have opportunities for

PROGRAMMING/SYSTEMS MANAGER
At least 5 years supervisory responsibility and the ability to handle multiple projects. Data Base experience is required

ASSISTANT DATA ADMINISTRATOR
Experience in Data System Design and Data Dictionary usage required. Exposure to IBM IMS/DB beneficial

DATA BASE ANALYST
Experience with DBD control, PSB control, ACB control or a related area is required. You should have the ability to maintain physical data bases, logical data bases, and secondary data bases

SENIOR SYSTEM ANALYST
Experience that will enable you to conduct feasibility studies and develop an entire project. You will also work closely with users at the executive level.

PROGRAMMER/ANALYST
You should have the knowledge necessary to perform total system design methods and techniques, time and cost analysis, and form design. Strong user interfacing is required

SENIOR PROGRAMMER
Experience is required in advanced OS/JCL and advanced dump reading and debugging, plus good communication skills are required

PROGRAMMER TRAINEE
A Bachelor's degree in Computer Science, Accounting, or Math is required along with an ability to work with OS/JCL and COBOL

Enjoy competitive salaries and generous fringe benefits that include life, medical, and dental insurance, a hospitalization plan, a pension plan, disability income, and paid holidays and vacations. Few other cities in the United States can offer you the interweaving of the old and the new of New Orleans's famous French Quarter section. And few other companies can bring you the opportunity to excel in your career that our client offers

All fees and relocation expenses paid

For immediate attention, Call COLLECT (216) 579-1477, Sunday 12 Noon to 6 PM or Monday-Friday 9AM-6 PM, or send your resume in complete confidence to:

Pathfinder Consultants, Inc.
1900 Euclid Avenue/Suite 405
Cleveland, Ohio 44115

Our client is an equal opportunity employer M/F

CONNECTICUT

We have been retained by several major Connecticut corporations to locate individuals with the following experience

Sr. Tech Consult, DB, TP, hard/soft	to $30K
Sr. Systems/Analyst, H6000, IDS, COBOL	to $27K
Software Sys Dev., assembler, MVS/OS	to $26K
Sr. Prog Anal, acctg systems, 370/OS RJE COBOL	to $26K
Sr. Prog Anal, 3033 MVS, COBOL, PL/1	to $25K

Salaries commensurate with experience. Relocation and travel expenses paid. Respond to Toby S. Bromberg

**3780 Whitney Ave.
Hamden, Ct. 06518
(203) 288-7461**

Call, clip coupon, or send your resume in confidence.

BREEN DATA Division of the Breen Group, Inc

Name ____________
Address ____________
City ____________ State ________ Zip ____
Employer ____________ Title ____________
Position description ____________
Telephone ( ) ____________ Present salary ____

CORNELL UNIVERSITY

Senior Data Communications Specialist

The Opportunity

Cornell University is significantly upgrading its data communications facilities. You will provide the technical leadership for implementing and tailoring state-of-the-art technology to fit Cornell's present and future requirements. The position needs someone with both electronics and software experience. A strong background in electronics is necessary. Previous packet network experience and 370 programming experience are definite pluses. Experience with VM/370 or 3705 software would be helpful. As a senior staff member you will contribute both ideas and technical talent to the design and implementation of solutions to data communications problems.

The Place:

Cornell University is located in the beautiful Finger Lakes region of upstate New York. The region offers great summer and winter sports. The Teleprocessing and Small Computer Support Group is a young organization dedicated to providing inexpensive, technically advanced data communications and micro-computer support to the Cornell computing community. The benefits package is attractive.

Please send your resume to Richard Alexander, OCS - Langmuir Lab, Cornell University Research Park, Ithaca, N.Y. 14853; or call (607) 256-7516. Call today. Cornell is an Affirmative Action employer.

APPLICATIONS DEVELOPMENT SPECIALISTS

International marketing corporation with exceptional financial strength seeks dedicated results-oriented professionals to join our Information Services Department. Our rapid growth and total commitment to automate all phases of our operation has created a situation which presents unique, rewarding and challenging opportunities

Our major projects for this year are

- Migration to an OS/VSI, DBMS environment.
- Planning the migration from a maximum configuration 370/145 to a 303X, MVS or similar environment
- Fully automating the Order Processing/Fulfillment function

Projects for the early 1980's will address aftermarket, retail and wholesale marketing, text processing and typesetting, subscription fulfillment, front and back office hotel operations, and the needs of international subsidaries

To accomplish this, we need Analyst/Programmers whose qualifications range from one year of solid ANS COBOL programming to senior applications project staff responsibility in either a Direct Response Marketing, Brokerage, Distribution, Leisure Time, Publication Circulation, or Retail corporation

Compensation for these positions includes base salary at market, and exceptional cash and deferred profit sharing plans, in a non-restrictive environment where career growth, both within and beyond information systems, is based solely upon your performance. Interview and relocation expenses are company paid

For immediate, confidential consideration, qualified individuals, who possess the ability to view information systems from a business perspective, should address a letter or resume outlining previous professional accomplishments, including a salary history, to

**Applications Development Manager
The Bradford Exchange, Ltd.
9333 North Milwaukee Avenue
Niles, Illinois 60648
or
Call our Personnel Manager collect, between
8 am and 9 pm cst, at (312) 966-2770.**

An Equal Opportunity Employer M/F

*** NEW HAMPSHIRE ***

Come and live where others vacation. Avoid the commute, the weekend trips, sales taxes and income taxes. We have immediate openings for professional people for development of challenging and diversified statewide computer applications on a large Honeywell 6060 featuring data communications and time sharing. We have a Project Manager position, Analyst/Programmer positions and Programmer positions open for the right people with the right qualifications. We offer salaries commensurate with experience and education and time off to take advantage of where you live — 11 paid holidays plus three weeks annual leave.

Submit resume and salary history to

**STATE OF NEW HAMPSHIRE
Centralized Data Processing
Hazen Drive, Concord, NH 03301**
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SALES REPRESENTATIVE

**Experienced in computers,
for new portable system.
Salary + Comm. + Bonus.
Apply in person.**

**FINDEX
1625 W. Olympic, #707
Los Angeles, CA 90015
(213) 380-6950**

**FIELD ENGINEERS
CHICAGO AREA CO.
NEEDS EXPERIENCED
IBM UNIT RECORD AND/
OR MINI COMPUTOR
SERVICE ENGINEERS.**

HAMPTON

DATA PROCESSING

Expansion of our Florida Corporate Data Processing department has created new ground floor opportunities in the following areas:

SYSTEMS ANALYSIS - Experienced analysts needed at all levels from analyst-programmers thru Senior systems analysts. Business systems experience is required and must include accomplishments in several of the following: MRP, Shop Floor Control, Inventory Control, Order Entry, Personnel, General Ledger, Cost Accounting, Field Service, Remote Plant Support

PROGRAMMING - Experienced programmer-analysts needed for work in application areas (COBOL, DMS), and technical areas (CICS, TOTAL, TP). Environment is DOS/VS

SYSTEMS INTEGRATION SPECIALIST - To be responsible for coordination of Data Definition among multiple application areas and management of Central Data Base activities.

All of these positions are located in Melbourne, Florida, one of the most attractive areas on the Atlantic Coast. We offer an excellent salary, benefits and exceptional growth opportunity. For prompt confidential consideration, please send your resume to Tom Knight, Dept #267

**DOCUMATION
INCORPORATED**
P.O. BOX 1240
MELBOURNE, FL 32905

An equal opportunity employer m/f/h/v

Computer Professionals

One of the nation's top 50 data processing companies is expanding its professional services staff. Assignments are primarily new development or major enhancement to commercially oriented systems, many involving data base and/or data communications technology. Applications include insurance, banking, finance, manufacturing, transportation and oil and gas.

Staff members are chosen for their creativity and innovative spirit, as well as their technical and professional skills. The company is searching for programmer/analysts with experience in these areas

- IMS DESIGN
- IMS/MFG/FINANCE
- UNIVAC 1100 COBOL
- ALC, INSURANCE OS COBOL, BAL OR PL/
- MARK IV
- CICS
- INTERCOMM
- TOTAL
- PDP-11, RSTS

Positions are available in Austin, Dallas, Fort Worth, Houston, San Antonio, San Francisco, Los Angeles, Seattle, Portland, Anchorage, Des Moines and Cleveland.

If you are a bright, aggressive individual with at least one year experience, we want to hear from you. Investigate the opportunities available; the confidentiality of your inquiry is assured. Telephone Lois Flory at 206/385-038[illegible] or mail your resume today. And if you're interested but too busy to send a resume, complete the following form

NAME ______
ADDRESS ______
CITY ______ STATE ______ ZIP ______
HOME PHONE ( ) ______ WORK PHONE ( ) ______
HARDWARE EXPERIENCE ______
LANGUAGE EXPERIENCE ______
OPERATING SYSTEMS ______
APPLICATIONS ______
PRESENT SALARY ______ GEOG PREF ______

Please send resume to:

Lois Flury
Post Office Box 1180
Port Townsend, Washington 98368

equal opportunity employer m/f/h

SYSTEMS ANALYST
CONSULTING PROGRAMMERS

Outstanding opportunities for experienced EDP personnel with interests in corporate and manufacturing systems work. We are an IBM 370, Cobol shop in process of developing data-base and on-line applications. We need:

Senior Systems Analysts experienced in manufacturing systems with proven ability in development and implementation of medium to large systems. Degree plus financial, on-line and data-base experience preferred.

Consulting Programmers and Programmer Analysts — Positions available at all levels. Requires Cobol and assembler language experience on medium to large computer system. Degree and experience in manufacturing applications preferred.

If you are interested in becoming part of a dynamic, high skilled and professional systems development team, please send resume to.

STOUFFER'S
5750 Harper Rd.
Solon, Ohio 44139

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HARDEE'S
IS EXPANDING AND NEEDS

ANALYSTS

...with 5 years of business application.

PROGRAMMERS

...with at least 3 years of COBOL.

These opportunities are on the corporate data processing staff located in eastern North Carolina

Our expansion plans will continue to create advancement opportunities for ambitious people. We provide competitive salary and fine benefits. Send resume and salary history to:

Jerry L. Rowe,
HARDEE'S FOOD SYSTEMS, INC.,
P.O. Box 1619,
Rocky Mount, N.C. 27801.

An Equal Opportunity Employer

Hardee's

Systems Programmers

Our Southern California client is a well known computer manufacturer with data centers in Orange County, Marina del Rey and the San Fernando Valley. We have immediate openings for Systems Programmers with IBM 370 DOS or OS backgrounds. Experience with DL/1 or CICS and/or TOTAL or INTERCOMM is a real plus. Each data center will experience hardware upgrades within the year.

The company is rapidly expanding its data processing department to keep up with its overall growth in sales. Excellent fringe benefits and salary coupled with a choice of 3 Southern California locations make this an attractive opportunity. We are consultants to management. Please send resume and salary history in confidence to **Randy Hinkley, 2041 Rosecrans, Suite 363, El Segundo, CA 90245. (213) 640-1632**

professionals for computing, inc.

JOURNALIST

Writer with solid computer industry experience to produce a monthly publication covering a wide range of computer-related topics. Must have excellent journalism skills (news writing, headline writing, layout). Samples of your work should be included with your resume.

Please forward resume to Box 1860, 797 Washington St., Newton, MA 02160

EOE M/F

SENIOR APPLICATIONS

PROGRAMMER/ANALYST
HARVARD MEDICAL SCHOOL

Will work with administrative and academic departments to design and develop applications systems. Participates as Project Leader of systems development work utilizing up-to-date, on-line, interactive computer software and hardware. Works with user departments to define applications, and design required data base structures. Designs and programs application software using the COBOL language and the extensive data base software provided on the HP 3000 Series II Model 6 Computer. Degree preferred. Requires 4-5 years experience in applications development and programming work for business and accounting systems. We offer excellent benefits.

Submit resumes to Information Systems Coordinator, Harvard Medical School, Bldg. A, Computer Center, 25 Shattuck St., Boston, MA 02115.

THE TOUCHETTE CORP

ANALYST/PROGRAMMERS

We need qualified analyst/programmers with a minimum of 2 years experience in the design, programming and implementation of commercial applications. Syracuse, NY, one of US's most attractive cities. Lake Ontario, Thousand Islands, Finger Lakes, less than 2 hours away. 3 hours from site of 1980 Olympics.

- Salary wide Open!
- Company paid interviews
- Company paid benefits
- 10 year old growth oriented company occupying new modern office building
- Univ. of Nebraska's nationwide survey rates Syracuse No. 1 in New York State.
- Syracuse - a great place to live and work!

Call Collect, or send Resume to:

Mr. Daniel J. Healy
THE TOUCHETTE CORP.
8701 Enterprise Parkway
E. Syracuse, N.Y. 13057
(315) 445-0291

SENIOR SYSTEMS ANALYST

Bloomington based manufacturing firm has an immediate opening for individual to analyze and design complex data processing system.

Duties include conducting feasibility studies of proposed computer applications and participating in the design and development of systems and procedures.

College graduate major in Business Administration for Computer Sciences plus minimum of 2 years experience as systems analyst.

Excellent benefits program includes tuition reimbursement, hospital and dental insurance, profit sharing and pension. Send resume in confidence to

donaldson

Corporate Personnel Department
DONALDSON COMPANY INC.
P.O. Box 1299
Minneapolis, MN 55440

An Equal Opportunity Employer M/F

Mobil

ANALYSTS

Business growth has created outstanding opportunities for Systems and Programmer/Analysts with career interest in Information Systems Management. Current openings are in our Richmond, Virginia location.

PROGRAMMER/ ANALYST

We expect a thorough working knowledge of COBOL, RPG II, or FORTRAN with 3-4 years experience in writing and debugging programs for business applications.

SYSTEMS ANALYST

We prefer a BS in math or business, or equivalent work experience. In addition, the ideal candidate will be business-oriented and have two years experience as a Programmer/ Analyst, as well as project leadership experience.

We provide a highly attractive compensation package. For more details, send your resume and salary history to Jo Ann Davis, **MOBIL CHEMICAL COMPANY**, P.O. Box 26683, Richmond, Virginia 23261.

We are an equal opportunity employer.

Mobil

Computer Project Leader

Nuclear Records Management

Arizona Public Service Company is an investor-owned utility acting as project manager and operating agent for the Palo Verde Nuclear Generating Station.

We have an exceptional opportunity for a self-motivated individual with project leader capability to take charge of the Nuclear Records Management computer systems development and support. The successful candidate must have a background in the nuclear industry and/or information retrieval applications. Degree in Engineering, Math, or other related area preferred. This position is based in Phoenix, Arizona, with local travel only. Interested applicants please send resume including salary history to.

Tom York

ARIZONA PUBLIC SERVICE COMPANY

P.O. Box 21666, Station 1199
Phoenix, AZ 85036

an equal opportunity employer

aps!

SYSTEMS ANALYST PROGRAMMER

HEALTH CARE INDUSTRY

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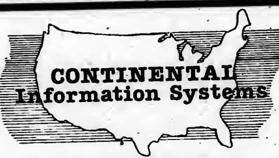

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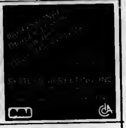
Montpelier, Vt. 05602
ATT: Ms. Arlene McLeod

Due to the selection format, vendors are requested to submit a letter of intent to bid based on the system specifications presented in the preliminary RFP by March 12, 1979. This letter of intent should be sent to the above address.

The Request for Proposals will be issued on March 10, 1979. Deadline for submission of proposals is 2:00 P.M., EST., April 2, 1979.

The Preliminary RFP contains an accurate description of our systems's functional requirements and the actual RFP will not change these requirements. For detailed information, contact Ms. Arlene McLeod (802 828-2334).



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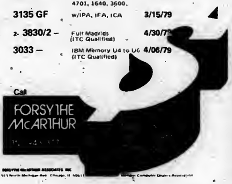

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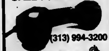

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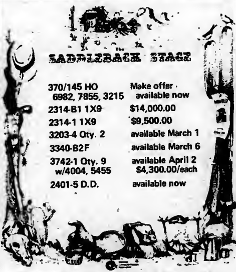

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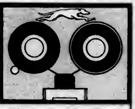

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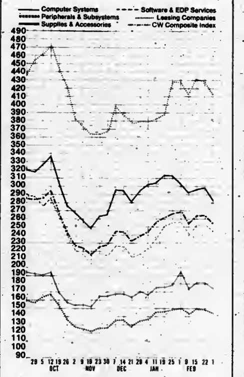

Earnings Reports

PERKIN-ELMER
Three Months Ended Jan. 31

	1979 (000)	1978 (000)
Shr Ernd	$.61	$.41
Revenue	179,932	a137,215
Earnings	12,053	8,176
6 Mo Shr	1.09	.65
Revenue	329,241	a252,808
Earnings	21,621	12,794

a-Restated

HAZELTINE
Year Ended Dec. 31

	1978	1977
Shr Ernd	$2.14	$1.78
Revenue	105,931,000	95,786,000
Earnings	4,362,000	3,575,000
3 Mo Shr	.65	.52
Revenue	30,175,000	25,811,000
Earnings	1,326,000	1,005,000

LITRONIX
Three Months Ended Dec. 31

	1978	1977
Shr Ernd		$.56
Revenue	$7,334,000	2,720,000
Tax Cred	a83,000	b7,211,000
Earnings	(365,000)	6,914,000

a-Tax-loss carryforward. b-From Chapter XI proceedings.

MOTOROLA
Year Ended Dec. 31

	1978 (000)	a1977 (000)
Shr Ernd	$4.04	$3.46
Revenue	2,218,744	1,852,518
Earnings	125,162	106,951
3 Mo Shr	1.08	.98
Revenue	635,558	525,265
Earnings	33,477	30,340

a-Restated to reflect inclusion of Universal Data Systems, acquired in December 1978.

THRESHOLD TECHNOLOGY
Three Months Ended Dec. 31

	1978	1977
Revenue	$746,090	$393,683
Loss	61,888	114,467
6 Mo Rev	922,871	782,760
Loss	261,348	199,568

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 28, 1979

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE FEB 28 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	28- 69	36 5/8	-3	-7.5
N	BURROUGHS CORP	59- 87	64 3/4	-1 1/4	-1.8
O	COMPUTER AUTOMATION	15- 44	19	-3 3/4	-16.4
N	CONTROL DATA CORP	23- 44	30 1/4	-2	-6.2
O	CRAY RESEARCH INC	8- 33	23	-3	-11.5
N	DATA GENERAL CORP	42- 71	59 1/8	-2 7/8	-4.6
N	DATAPOINT CORP	34- 75	64 1/8	-3 5/8	-5.9
N	DIGITAL EQUIPMENT	39- 58	49 1/2	-2 7/8	-5.4
N	ELECTRONIC ASSOC.	2- 13	6 3/4	- 1/8	-1.8
A	ELECTRONIC ENGINEER.	9- 19	10 7/8	- 5/8	-5.4
N	FOUR-PHASE SYSTEMS	19- 46	29 1/4	-2 1/8	-6.6
N	FOXBORO	28- 40	28 3/4	-1	-3.2
O	GENERAL AUTOMATION	7- 26	13	+ 3/4	+6.1
O	GRI COMPUTER CORP	1- 3	1 1/4	0	0.0
N	HEWLETT-PACKARD CO	62- 95	85 1/8	- 5/8	-0.7
N	HONEYWELL INC	43- 76	68	-4 1/8	-6.0
N	IBM	236-316	300	-6	-1.9
O	MANAGEMENT ASSIST.	9- 29	18 3/8	-1 3/4	-8.6
O	MANUFACTURING DATA S	9- 23	19 1/2	-1 5/8	-8.0
O	MICRODATA CORP	10- 23	19 1/2	-1 3/8	-6.9
O	MINI-COMPUTER SYST	4- 8	4 3/4	- 1/2	-9.5
C	MODULAR COMPUTER SYS	7- 17	16 1/2	- 3/8	-2.2
N	NCR	37- 70	62 1/8	-4 1/8	-6.2
N	PRIME COMPUTER INC	20- 43	28 5/8	-2 5/8	-8.3
N	PERKIN-ELMER	17- 31	27 1/4	-1 1/4	-4.0
N	SPERRY RAND	33- 49	45 1/4	-1 7/8	-3.9
A	SYSTEMS ENG. LABS	11- 24	13 3/4	-1 5/8	-10.5
O	TANDEM COMPUTERS INC	13- 37	23 3/4	-2 1/2	-9.5
A	WANG LABS.	12- 36	31 1/8	-2 3/4	-8.1
	LEASING COMPANIES				
C	BOOTHE COURIER CORP	13- 21	18	-1 1/2	-7.6
O	COMDISCO INC	5- 22	21 1/4	- 3/4	-3.4
A	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 1/8	- 3/8	-10.7
O	CONTINENTAL INFO SYS	5- 15	8	- 1/2	-5.8
N	DATRONIC RENTAL	1- 3	2 1/8	0	0.0
A	DCL INC	3- 5	3 3/4	- 1/4	-6.2
N	DPF INC	8- 14	9 7/8	- 7/8	-8.1
N	ITEL	16- 36	21 5/8	-1 1/8	-4.5
N	LEASCO CORP	24- 39	38	- 5/8	-1.7
O	LEASPAC CORP	1- 4	2 5/8	+ 1/8	+5.0
A	PIONEER TEX CORP	3- 7	3 1/8	0	0.0
N	U.S. LEASING	13- 20	14 1/4	- 1/2	-3.3

EXCH		1978-79 RANGE (1)	CLOSE FEB 28 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	8- 22	15 7/8	- 3/8	-2.3
A	APPLIED DATA RES.	8- 17	11	- 3/4	-6.3
N	AUTOMATIC DATA PROC	24- 36	28	0	0.0
O	COLEMAN AMERICAN COS	1- 2	5/8	+ 1/8	+25.0
C	COMPU-SERV NETWORK	5- 12	8	-1	-11.1
O	COMPUTER HORIZONS	1- 9	5 1/4	- 1/2	-8.6
O	COMPUTER NETWORK	5- 10	5 3/8	- 3/8	-6.5
N	COMPUTER SCIENCES	8- 17	10 1/2	-1 3/8	-11.5
O	COMPUTER TASK GROUP	1- 5	3 3/4	0	0.0
C	COMPUTER USAGE	2- 4	2 3/8	- 3/8	-13.6
O	COMPUT AUTO REP SVC	4- 10	7 7/8	+ 1/8	+1.6
O	COMSHARE	6- 19	16 1/4	-1	-5.6
O	CULLINANE CORP	14- 33	19 1/4	-1	-4.8
O	DATA DIMENSIONS INC	6- 9	5 1/2	+ 1/4	+4.8
O	DATATAB	1- 2	2	0	0.0
N	ELECTRONIC DATA SYS.	15- 25	19	-1	-5.0
O	INSITE CORP	1- 3	1 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	- 1/8	-4.0
O	KEANE ASSOCIATES	3- 6	4 3/4	+ 1/8	+2.7
O	KEYDATA CORP	1- 3	2 1/4	- 3/8	-14.2
A	LOGICON	10- 19	11 1/8	- 7/8	-7.1
A	NATIONAL CSS INC	15- 36	27 5/8	-1	-3.4
O	NATIONAL DATA CORP	7- 13	9 1/4	- 3/8	-3.8
A	ON LINE SYSTEMS INC	12- 30	16 3/8	-1	-5.7
N	PLANNING RESEARCH	4- 10	6	- 1/2	-7.6
C	PROGRAMMING & SYS.	1- 1	1	0	0.0
O	RAPIDATA INC	3- 8	4 3/4	0	0.0
O	REYNOLDS & REYNOLDS	18- 36	28 1/2	+ 3/4	+2.7
O	SCIENTIFIC COMPUTERS	3- 9	7	- 1/2	-6.6
O	TYMSHARE INC	18- 41	32 5/8	-1 3/8	-4.0
A	URS SYSTEMS	5- 8	6 1/2	- 1/4	-3.7
N	WYLY CORP	1- 7	4 1/2	- 1/8	-2.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	14- 32	16 5/8	-1 3/8	-7.6
O	ADVANCED MEMORY SYS	7- 18	12 1/4	-1 3/4	-12.5
N	AMPEX CORP	10- 19	14 5/8	- 5/8	-4.0
O	ANDERSON JACOBSON	5- 10	6 7/8	- 3/8	-5.1
N	APPLIED DIG DATA SYS	9- 22	9 5/8	- 3/4	-7.2
O	BEEHIVE INT'L	3- 7	4 1/2	- 1/4	-5.2
A	BOLT, BERANEK & NEW	6- 14	11 3/4	+ 1/4	+2.1
N	BUNKER-RAMO	10- 22	19 1/2	-1 1/2	-7.1
A	CALCOMP	3- 13	7 1/2	- 1/4	-3.2
O	CAMBRIDGE MEMORIES	3- 9	3 1/2	- 1/4	-6.6
N	CENTRONICS DATA COMP	16- 37	32 3/4	+ 5/8	+1.9
O	COGNITRONICS	1- 4	1 5/8	- 3/8	-18.7
O	COMPUTER COMMUN.	4- 10	8 1/4	- 1/4	-2.9
O	COMPUTER CONSOLES	4- 10	9 3/4	+ 1/4	+8.3
A	COMPUTER EQUIPMENT	3- 6	4 3/4	+ 1/8	+2.7
C	COMPUTER TRANSCEIVER	1- 5	3 3/8	- 3/8	-10.0
C	COMPUTERVISION CORP	9- 33	32	- 3/4	-2.2
C	CONTEN	9- 38	27 3/4	-1 1/4	-5.2
A	CONRAC CORP	13- 26	13 7/8	+ 3/8	+2.7

EXCH		1978-79 RANGE (1)	CLOSE FEB 28 1979	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	3- 14	8	-1 3/4	-16.2
O	DATA 100	9- 20	19 1/2	0	0.0
A	DATA PRODUCTS CORP	14- 25	19	- 1/4	-1.2
O	DATUM INC	2- 6	2 1/8	0	0.0
O	DECISION DATA COMPUT	2- 4	4	- 1/2	-11.1
O	DELTA DATA SYSTEMS	1- 1	1/2	+ 1/8	+33.3
O	DOCUMATION INC	8- 34	20 7/8	-2 1/8	-9.2
O	DATARAM CORP	6- 32	14 1/2	- 1/2	-3.3
N	ELECTRONIC M & M	4- 9	4 3/8	- 1/8	-2.7
O	FIBRI-TEK	1- 2	3/4	- 1/8	-14.2
O	GENERAL COMPUTER SYS	1- 3	2 1/4	- 1/8	-5.2
O	GENERAL DATACOMM IND	9- 21	14	-1 1/2	-9.6
N	HAZELTINE CORP	10- 17	12 7/8	- 1/8	-0.9
N	HARRIS CORP	17- 36	26	-1 3/8	-5.0
O	INFOREX INC	5- 11	7 1/4	-1 1/8	-12.6
O	INFORMATION INTL INC	7- 32	29 1/4	- 3/4	-2.5
O	INFOTON	1- 1	2 1/8	0	0.0
O	[illegible] CORP	39- 62	54 1/2	-1 1/2	-2.5
A	LUNDY ELECTRONICS	4- 8	5	0	0.0
O	MSI DATA CORP	10- 19	10 5/8	- 5/8	-5.5
N	MEMOREX	27- 50	30 5/8	-2 1/2	-7.5
N	MOHAWK DATA SCI	6- 15	9 7/8	- 1/4	-2.0
O	ONLA	2- 6	6	+ 1/2	+9.0
O	PARADYNE CORP	9- 17	13 1/4	- 5/8	-4.5
O	PENRIL CORP	5- 12	8	-1 1/8	-12.3
N	PERTEC CORP	9- 17	8 7/8	- 5/8	-6.5
O	POTTER INSTRUMENT	2- 2	1 1/4	0	0.0
O	QUANTOR CORP	2- 5	2 1/4	0	0.0
O	RECOGNITION EQUIP	6- 13	7 1/2	- 1/2	-6.2
O	SCAN DATA	1- 5	2 5/8	- 1/8	-4.5
N	STORAGE TECHNOLOGY	19- 46	30 7/8	-3 1/8	-9.1
O	T BAR INC	14- 21	20	- 1/4	-1.2
O	TELEX CORP	4- 14	13 1/4	0	0.0
A	TEC INC	6- 11	6 3/8	0	0.0
N	TEKTRONIX INC	33- 56	49 5/8	-2 5/8	-5.0
N	TELTA	3- 9	4 7/8	- 5/8	-11.3
O	[illegible] SYSTEMS CO	9- 21	13	- 1/2	-3.7
O	[illegible] INC	1- 2	3/4	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMER BUS PRODS	6- 11	9	+ 1/4	+2.8
C	BALTIMORE BUS FORMS	1- 4	1	- 1/2	-33.3
A	BARRY WRIGHT	14- 36	14 7/8	-1 1/4	-7.7
O	CYBERMETICS INC	1- 1	5/8	0	0.0
O	DUPLEX PRODUCTS INC	13- 30	18 1/4	0	0.0
N	ENNIS BUS. FORMS	8- 17	13	0	0.0
N	3M COMPANY	43- 66	54 1/8	-2 7/8	-4.8
O	MOORE CORP LTD	26- 34	29 1/8	+ 1/2	+1.7
N	NASHUA CORP	18- 37	27 1/8	- 3/4	-2.7
O	STANDARD REGISTER	20- 27	23	+1	+4.5
A	TAB PRODUCTS CO	8- 16	12	-1 1/4	-9.4
N	VARCO	19- 52	51 1/2	0	0.0
A	WABASH MAGNETICS	10- 22	14 1/4	-1 1/4	-7.8
N	WALLACE BUS FORMS	18- 31	23 5/8	- 3/8	-1.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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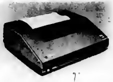
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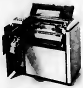
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